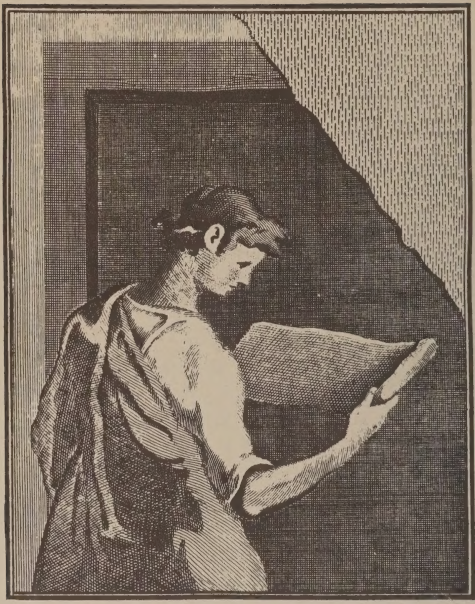

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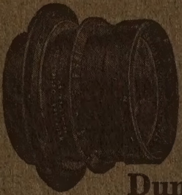

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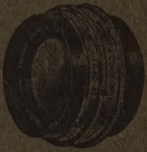

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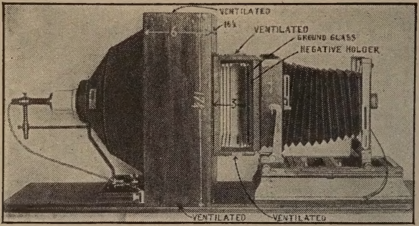

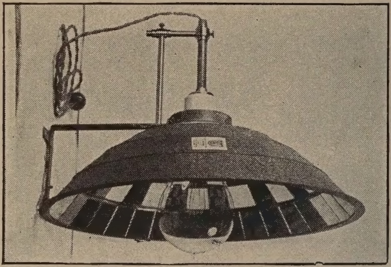

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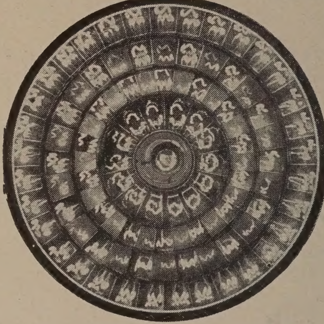

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E

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I

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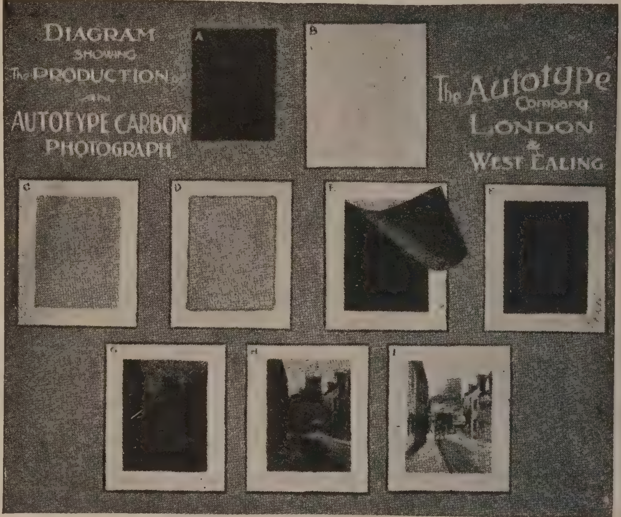
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B
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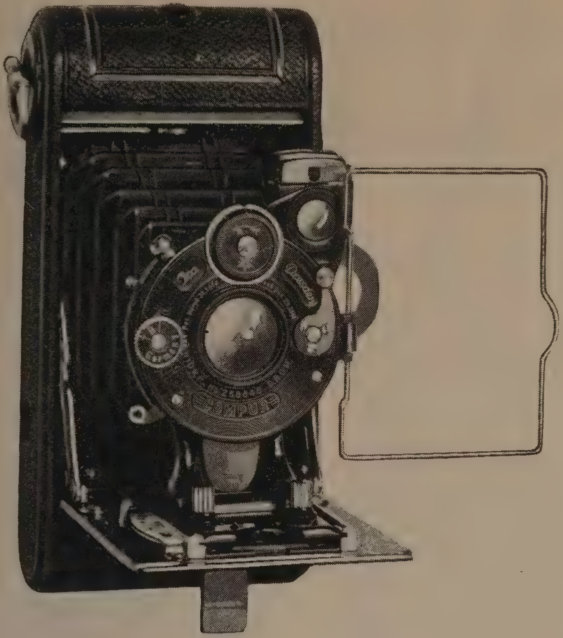

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VOLUME XXXIX

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PREFACE

THE contributed articles and illustrations in this, our 39th volume, have been selected from a great number submitted by leading workers, both amateur and professional, at home and abroad. The variety of subjects covered demonstrate how photography has spread to all fields of activities, and has become a commercial necessity in a great many lines. We trust this collection will prove of interest to our readers.

We take this opportunity to thank all who have assisted in the preparation of this volume, especially those whose contributions we were compelled to omit for lack of space.

The reader is invited to submit manuscripts or prints for reproduction in our next volume. These should reach us before August 25th, 1925. All prints will be returned if requested.

PERCY Y. HOWE, *Editor.*

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1924

	S	M	T	W	T	F	S		S	M	T	W	T	F	S		S	M	T	W	T	F	S
Jan.	..	..	1	2	3	4	5	May	..	..	..	..	1	2	3	Sept.	..	1	2	3	4	5	6
	6	7	8	9	10	11	12		4	5	6	7	8	9	10		7	8	9	10	11	12	13
	13	14	15	16	17	18	19		11	12	13	14	15	16	17		14	15	16	17	18	19	20
	20	21	22	23	24	25	26		18	19	20	21	22	23	24		21	22	23	24	25	26	27
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	10	11	12	13	14	15	16		15	16	17	18	19	20	21		12	13	14	15	16	17	18
	17	18	19	20	21	22	23		22	23	24	25	26	27	28		19	20	21	22	23	24	25
	24	25	26	27	28	29	..		29	30	..	..	..	..	..		26	27	28	29	30	31	..
Mar.	..	..	..	..	..	..	1	July	..	..	1	2	3	4	5	Nov.	..	..	..	..	..	..	1
	2	3	4	5	6	7	8		6	7	8	9	10	11	12		2	3	4	5	6	7	8
	9	10	11	12	13	14	15		13	14	15	16	17	18	19		9	10	11	12	13	14	15
	16	17	18	19	20	21	22		20	21	22	23	24	25	26		16	17	18	19	20	21	22
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1925

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	11	12	13	14	15	16	17		10	11	12	13	14	15	16		13	14	15	16	17	18	19
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	25	26	27	28	29	30	31		24	25	26	27	28	29	30		27	28	29	30	..	..	..
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Feb.	1	2	3	4	5	6	7	June	..	1	2	3	4	5	6	Oct.	..	..	..	..	1	2	3
	8	9	10	11	12	13	14		7	8	9	10	11	12	13		4	5	6	7	8	9	10
	15	16	17	18	19	20	21		14	15	16	17	18	19	20		11	12	13	14	15	16	17
	22	23	24	25	26	27	28		21	22	23	24	25	26	27		18	19	20	21	22	23	24
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Mar.	1	2	3	4	5	6	7	July	..	..	..	1	2	3	4	Nov.	1	2	3	4	5	6	7
	8	9	10	11	12	13	14		5	6	7	8	9	10	11		8	9	10	11	12	13	14
	15	16	17	18	19	20	21		12	13	14	15	16	17	18		15	16	17	18	19	20	21
	22	23	24	25	26	27	28		19	20	21	22	23	24	25		22	23	24	25	26	27	28
	29	30	31	..	..	..	..		26	27	28	29	30	31	..		29	30	..	..	..	..	..
April	..	..	..	1	2	3	4	Aug.	..	..	..	..	..	..	1	Dec.	..	..	1	2	3	4	5
	5	6	7	8	9	10	11		2	3	4	5	6	7	8		6	7	8	9	10	11	12
	12	13	14	15	16	17	18		9	10	11	12	13	14	15		13	14	15	16	17	18	19
	19	20	21	22	23	24	25		16	17	18	19	20	21	22		20	21	22	23	24	25	26
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1926

	S	M	T	W	T	F	S		S	M	T	W	T	F	S		S	M	T	W	T	F	S
Jan.	..	..	..	..	..	1	2	May	..	..	..	..	..	..	1	Sept.	..	..	..	1	2	3	4
	3	4	5	6	7	8	9		2	3	4	5	6	7	8		5	6	7	8	9	10	11
	10	11	12	13	14	15	16		9	10	11	12	13	14	15		12	13	14	15	16	17	18
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	24	25	26	27	28	29	30		23	24	25	26	27	28	29		26	27	28	29	30	..	..
	31	..	..	..	..	..	..		30	31	..	..	..	..	..		..	..	..	..	..	..	..
Feb.	..	1	2	3	4	5	6	June	..	..	1	2	3	4	5	Oct.	..	..	..	..	..	1	2
	7	8	9	10	11	12	13		6	7	8	9	10	11	12		3	4	5	6	7	8	9
	14	15	16	17	18	19	20		13	14	15	16	17	18	19		10	11	12	13	14	15	16
	21	22	23	24	25	26	27		20	21	22	23	24	25	26		17	18	19	20	21	22	23
	28	..	..	..	..	..	..		27	28	29	30	..	..	..		24	25	26	27	28	29	30
	..	..	..	..	..	..	..		..	..	..	..	..	..	..		31	..	..	..	..	..	..
Mar.	..	1	2	3	4	5	6	July	..	..	..	..	1	2	3	Nov.	..	1	2	3	4	5	6
	7	8	9	10	11	12	13		4	5	6	7	8	9	10		7	8	9	10	11	12	13
	14	15	16	17	18	19	20		11	12	13	14	15	16	17		14	15	16	17	18	19	20
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	28	29	30	31	..	..	..		25	26	27	28	29	30	31		28	29	30	..	..	..	..
April	..	..	..	..	1	2	3	Aug.	1	2	3	4	5	6	7	Dec.	..	..	..	1	2	3	4
	4	5	6	7	8	9	10		8	9	10	11	12	13	14		5	6	7	8	9	10	11
	11	12	13	14	15	16	17		15	16	17	18	19	20	21		12	13	14	15	16	17	18
	18	19	20	21	22	23	24		22	23	24	25	26	27	28		19	20	21	22	23	24	25
	25	26	27	28	29	30	..		29	30	31	..	..	..	..		26	27	28	29	30	31	..

SELLER OF OLD BOOKS. G. W. Harting.

The American Annual of Photography · · 1925

PHOTOGRAPHIC REVIEW OF 1924

By C. B. NEBLETTE

NO phenomenal progress has been made in either the science or practice of photography during the interval since the last installment of this review. There has been, however, that steady and gradual development which argues much for future progress. Work has continued on the problems of the photographic plate, the mechanism of exposure, and the importance of much that has been accomplished will only be evident when our conception of the matter rests on more stable experimental evidence. There are, as usual, rumors of promising inventions in color photography, while the transmission of photographs by telegraph appears to have reached a practicable stage. Thus, while nothing spectacular has been accomplished, considerable progress has been made which will likely bear fruit in the future.

HISTORICAL

The establishment of a Cinematograph group by the Royal Photographic Society of Great Britain was inaugurated by a lecture by Mr. Will Day on the "Antecedents of the Cinema." In this very interesting paper Mr. Day traces the work of various inventors on the problem of reproducing motion before the time of Muybridge, Lumiere, Edison, Jenkins and others. M. L. P. Clerc in a paper in *Revue Optique* on the origin of the Cinematograph has added some particulars dealing with the work of Plateau (1829-1833) and Lumiere (1895). A very interesting account of the development of the Cinematograph industry will be found in Talbot's "Motion Pictures—How They Are Made and Worked."

Day-Photo. Jour.
Clerc-*Rev. Opt.* 1924, 3,201.

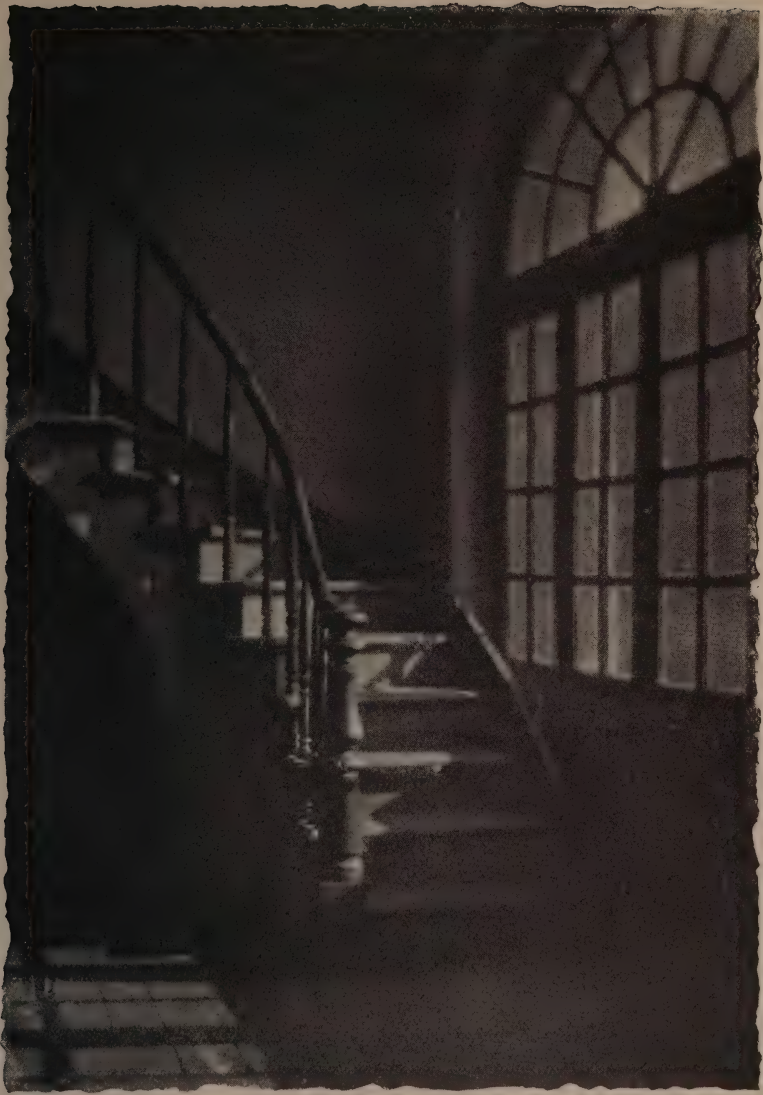
A further contribution to the history of Cinematography was made during the past year by E. Kilburn Scott in a paper on "The Pioneer Work of Le Prince in Kinematography" before the Royal Photographic Society of Great Britain. Although of French birth, Le Prince spent most of his life in England and the United States, where most of his experimental work appears to have been done. According to Mr. Scott, Le Prince was the first to make a successful camera for making more than 16 pictures per second, the first exhibitor of motion pictures on a screen, the first to appreciate the importance of flexible film, and the first to use perforated film and sprocket wheels. His sudden and complete disappearance is an unsolved mystery.

Photo. Jour. 1923, 63, 373.

NEW PUBLICATIONS

The outstanding book of the year was *Photography as a Scientific Implement*, a collective work by thirteen different authors treating of the use of photography in various branches of science and industry. After a chapter on the history of photography and the optics of photography, Dr. Sheppard contributes a very complete review of our present conception of the theory of the photographic process. It is one of the best reviews of photographic theory which we have seen in a long time, and we do not believe it has been equalled. The remainder of the work, and the larger part, consists of chapters on astronomical photography, photomicrography, aerial map making by photography, the use of photography in physics, chemistry, etc. A book that should be in the hands of every serious photographer.

In May, 1923, the Faraday Society held a very important discussion on the physical chemistry of the photographic process at which twenty-six papers were delivered in full, or in abstract. These papers by various authorities from five different countries have since been collected in a separate volume consisting of 405 pages which may be obtained from the Faraday Society, 10 Essex Street, Strand, London W. C. at 12 shillings 6 pence. While it does not contain anything



A CORNER IN
THE OLD CABILDO.

HAROLD K. FREDERICK.

of a revolutionary nature, it does afford a very complete exposition of our present conception of photographic theory, and the directions of modern photographic research, and should find a place in the library of every photographer who is seriously interested in the science of the subject.

Under the title *Real Pictorialism* which forms the first of a series of tracts on pictorial photography, Mr. F. C. Tilney discusses the matters which constitute pictorialism and in what direction future progress in pictorial photography must be made. While one cannot agree with all that Mr. Tilney says, one must admit that there is a good deal of thought in it, and that it contains much that is of pertinent value.

Oil and bromoil workers will doubtless welcome the issue of the second number of the series of tracts on pictorial photography being published by Henry Greenwood and Co., the publishers of the *British Journal.* This second number is devoted to *Oil and Bromoil Transfer,* and contains a very clear and complete explanation of the methods employed by Mr. Fred Judge, F.R.P.S. in the production of the admirable transfer prints for which he is well known. The second part of the tract consists of some observations on oil and bromoil and presses for transferring by Mr. F. C. Tilney. The tract contains four illustrations from transfers by Judge, Bairstow, Blow and Demachy. At the low price of one shilling it is well worth its cost.

In the third number of the series of tracts on pictorial photography. *The Art of Pigmenting,* Mr. Bertram Cox, F.R.P.S. describes his personal methods of pigmenting, and gives many useful and important pointers in connection with the pigmenting of oil and bromoil prints. Coming from the hands of such a master of the process it cannot fail to be of value to less experienced workers. Four reproductions of pigmented prints are given, and each of these is reviewed by Mr. F. C. Tilney, who deals with the possibilities of the pigment processes. At the low price of one shilling this is a work which should be in the hands of every oil worker.

One of the most valuable publications of the year for the amateur as well as the professional photographer is *Print Perfection: How to Attain It,* by Dr. B. T. J. Glover whose previous work on positive printing processes has been noticed in previous years of this series of abstracts. The

NIGHT'S AWAKENING. J. M. WHITEHEAD.

present work may be regarded as the outgrowth and summing up of these papers, and provides in a handy and complete form the system and rules developed by Dr. Glover for securing prints of the highest technical quality. It is a book which will appeal to every photographer who wishes to improve the quality of his prints, and we are sure that there are but few photographers who can adopt the systems outlined without benefitting thereby.

The work on the *Formation of the Photographic Image* by Dr. E. Goldberg which we termed one of the outstanding books of last year has been translated into French, and is appearing in the French Journal *Science Technique et Industries Photographiques.* An English translation of this work is badly needed.

W. L. F. Wastell adds another book to the lot at the choice of the amateur photographer in his *Progressive Photography.* It is only fair to say to Mr. Wastell that his work, if it contains nothing new or off the beaten track, is at least engaging and reliable in its advice on topics relating to the amateur worker.

PHOTOGRAPHIC OPTICS AND APPARATUS

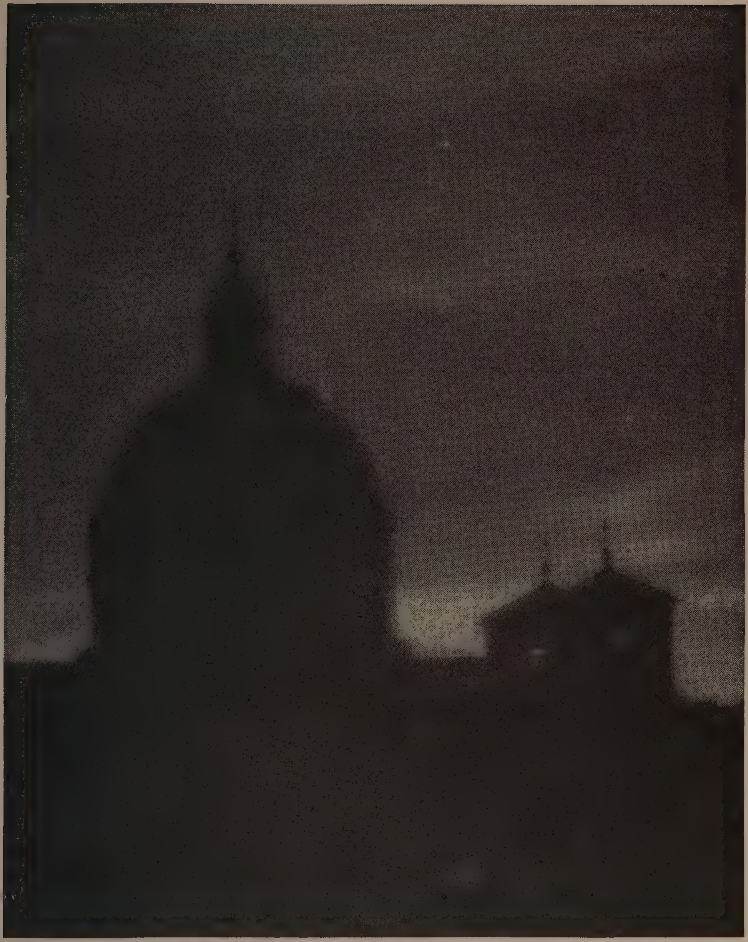
Carl Zeiss patent—an objective of three lenses in which the last surface is aspherical. *B. P.* 199,013/22.

H. W. Lee and Kapella Ltd. patent an objective of the Tessar type in which the rear cemented surface is collective with its convex side outward. The distance on the axis between the central dispersing component, and the rear component, is not less than three times that between the front component and the dispersing lens. *B. P.* 209,371/23.

A. and H. D. Taylor patent a form of the Cooke triplet consisting of three simple lenses and designed especially for projection. *B. P.* 210,705/23.

F. Urban and C. P. Goerz patent an astigmatically corrected doublet consisting of four air spaced lenses, two double convex, one negative meniscus, and one double concave dispersing lens. The aperture is F/2. *U. S. P.* 1,474,743/22.

Carl Zeiss have patented and placed upon the market a teleobjective of the fixed magnification type under the trade name Teletessar. The front component consists of two lenses cemented together, the general form of the lenses being



ST. JOSEPHATS.
(Bromide)

WM. C. VERBURGT.

similar to the corresponding component of the Tessar. The back combination consists of two cemented menisci, the inner converging and the outer diverging, the cemented surface having a collective effect. The lens is made according to *B. P.* 179,529/22 and not *B. P.* 145,548. The latter differs from the former in the removal of the air space between the lenses of the front component.

An aplanatic lens having an aperture of F/1 and consisting of four glasses of equal power and refractive index is described by Smith in the Transactions of the Optical Society. The objective is not corrected for color.

Trans. Opt. Soc. 1922-23, 24, 22.

M. Deve describes the apparatus used at the French *l'Institut d'Optique* for determining the focal length, position of the nodal points, and aberration curves of optical systems including photographic objectives. *S. T. I. P.* 1923, 3, 112.

L. Lenouvel contributes to the French Journal of Photo-Science *Science Technique et Industries Photographiques,* a paper on the determination and measurement of the aberrations of optical systems. After reference to the methods of Houidaille and Hartmann the author proceeds to describe an apparatus designed by him and built by the Etablissements Gallus for accurately and conveniently determining the aberrations of photographic objectives. Illustrations of aberrations are given and means of determining from these the curves showing the amount of aberration present. *S. T. I. P.* 1924, 4, 33.

A. C. Banfield has described a camera made for his own personal practice which embraces a number of rather unusual features. It is of the stand type and takes plates 2¼ x 3¼ inches. It has an extra long bellows and focusses from the rear, the back folding up within the body of the camera which is attached to the front. This particular construction allows an extraordinary amount of rise and fall of front and accommodates large and heavy lenses of large aperture, also telephoto lenses. The camera is fitted with a between-the lens shutter, and provision is made for rapidly changing from one lens to another. *Photo. Jour.* 1923, 63, 213

PROBLEMS OF THE PHOTOGRAPHIC PLATE

Drs. Sheppard, Trivelli and Wightman sum up quite admirably the existing theories of photographic exposure in a paper

RUTH PAIGE.

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contributed to the conference held by the Faraday Society on the physical chemistry of the Photographic process last May. The bearing of the observed data on the various theories is discussed and some results of work with chromic acid given.

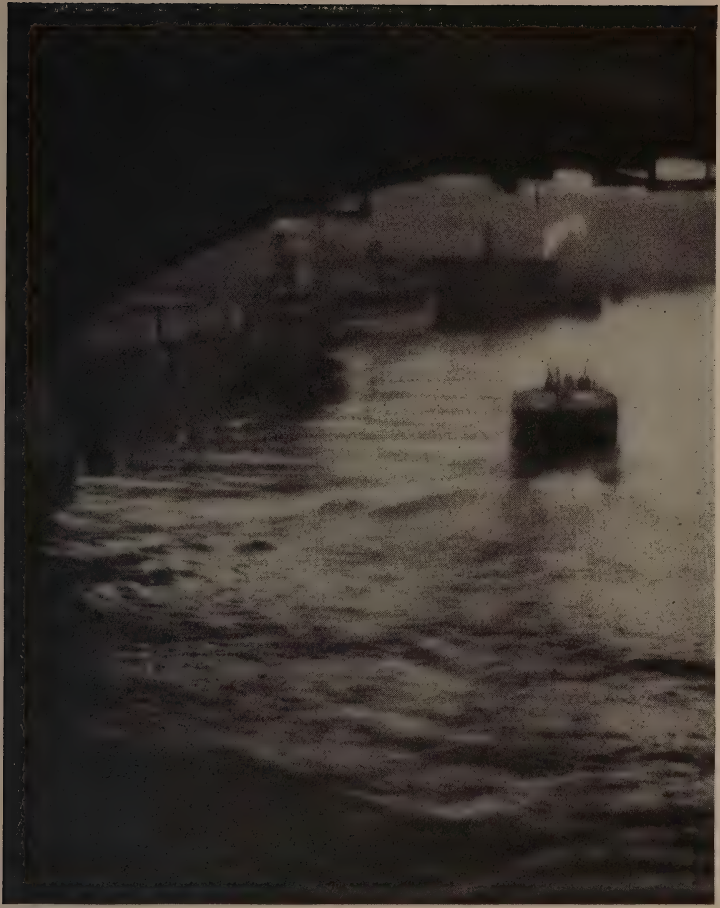
Clark has continued his work on the effect of sodium arsenite on the photographic plate, and concludes as a result of the great similarity in the action of light and sodium arsenite that it is probable that the final result is the same with both. It is shown that arsenite does not re-act with sodium bromide. Consequently, since it makes a plate developable it appears that there must be some substance other than silver bromide in the emulsion which is reduced by arsenite and light to form centers for development. Treatment with chromic acid reduces but does not destroy the sensitiveness of an emulsion. He concludes as a result of the investigations that sensitiveness is due principally to the existence of traces of an unknown substance.

Photo. Jour. 1923, 63, 230.
See also Renwick—Brit. J. Photo. 1923, 70, 382.

In a paper in the *British Journal of Photography,* Mr. F. F. Renwick discusses the recent work on sensitivity, and the formation of the latent image; also gives an explanation based on his colloidal silver theory of Becquerel's observation that silver halides are rendered sensitive to red and yellow after a brief exposure to white light. *Brit. Jour. Photo.* 1923, 70, 382.

In a paper in the *Photographic Journal,* W. Clark of the British Photographic Research Association gives the results of further investigations on the action of chromic acid on photographic emulsions. He finds that there is a lateral shift of the characteristic curve of a single layer plate. The gamma is unaffected if sufficient treatment is given, but the range of the curve is decreased. An increased gamma is obtained with short treatment with chromic acid. Experiments with sodium arsenite followed by chromic acid lead to approximately the same results as a daylight exposure followed by chromic acid. *Photo. Jour.* 1924, 64, 91.

The work of Drs. Wightman, Sheppard and Trivelli of the Eastman Research Laboratory on the relation between the dispersity of silver halides in the photographic emulsion, and its properties, is criticized by Germann and Hylan who argue that the finer the grain the greater should be the sensitive-



THE RIVER. PETER G. PETRIDIS.

ness. This is just opposite to what Wightman, Trivelli and Sheppard have found, and does not agree with experimental evidence collected by numerous workers over a number of years. It has been repeatedly shown that although there is no necessary relation between size and sensitiveness, in practice the larger grains are nearly always the more sensitive. If Messrs. Germann and Hylan have any experimental data in support of their theory, no doubt emulsion makers would be quite pleased to get hold of further details, even at a large outlay, as the production of ultra-rapid emulsions of fine grain has been one of the greatest problems of the emulsion maker for years. *Science* 1923, 58, 332.

Wightman, Trivelli and Sheppard reply to the criticism of Germann and Hylan in a communication to *Science* 1923, 58, 1510.

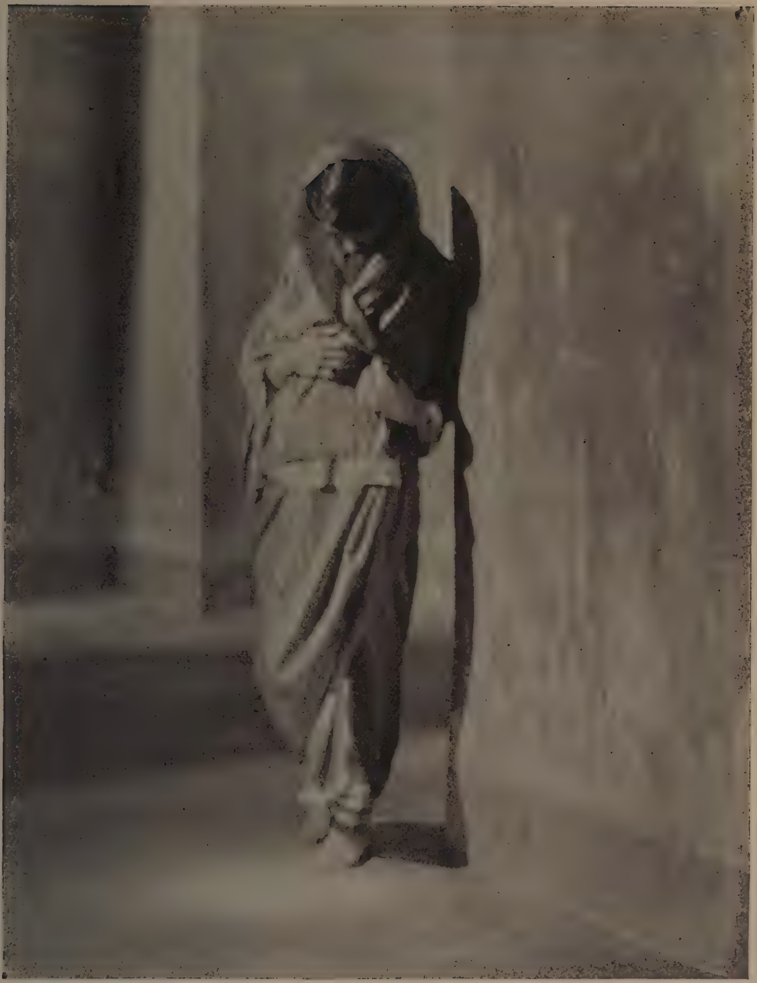
In a paper on the "Dispersity of the Silver Halides in Relation to their Photographic Properties" delivered at the recent symposium on colloid chemistry at the University of Wisconsin, Dr. S. E. Sheppard discusses the relation between grain size and sensitiveness, the effect of the distribution of different sizes of grains on sensitiveness, and the various theories of photographic exposure. The paper is a very valuable summary of our present conception of the subject indicated by the title.

Colloid Symposium Monograph (*University of Wisconsin*) *p.* 346.

F. F. Renwick in a paper to the Royal Photographic Society confirms some points raised by Sheppard in the above paper and questions the accuracy of others. *Photo. Jour.* 1924, 64, 324.

On the Relation Between Exposure and Number of Developable Centers. A discussion of the results obtained by Svedberg and Schunk at the University of Wisconsin with single layer plates bathed in an agent which tends to prevent reversal, acetone-semicarbazone being used for this purpose. It is concluded that solarization, or the destruction of the developable centers by light, plays an important part even in normal exposures. It is stated that in the future measurements of the relation between the exposure and the percentage number of developable centers will have to be made with parallel plates, one treated and the other not treated with the reversal preventing agent. *Photo. Jour.* 1924, 64, 272.

Dr. Luppo Cramer recommends the addition of para-



THE OUTCAST. HOWARD CLOYES.

phenylene diamine hydrochloride to emulsions for the purpose of preventing latent fog. He claims that this method is superior to the use of bichromate as advised by Eder in that it does not reduce the speed of the emulsion.

J. S. C. I. 1924, 43*B*, 234.

L. Scharlow describes the details of manufacturing a bromide emulsion in which the usual lengthy washing of the emulsified silver halide in order to eliminate the excess silver halide is avoided by precipitating the halide in excess bromide in the presence of a small quantity of gelatine and washing at this stage, and then emulsifying in further gelatine. The plates and paper coated with emulsion prepared in this manner have approximately the same speed as bromide paper, and can be used for enlarging. *Photo. Ind.* 1924, 233.

SENSITOMETRY AND TONE REPRODUCTION

The fourth Hurter and Driffield Lecture of the Royal Photographic Society was delivered May 6, 1924, by Dr. C. E. K. Mees, Director of the Eastman Research Laboratory, who took as his subject *"The Photographic Reproduction of Tone."* It is altogether fitting that a man such as Dr. Mees, who has himself done so much towards the development of the H and D system of sensitometry, should deliver this fourth lecture on a subject which is really an extension—and a very important one of the work of Hurter and Driffield. It is a paper which cannot well be abstracted, but it is one which is distinctly acceptable, as by far too little work has been done on the problem of tone reproduction with positive printing processes.

Photo. Jour. 1924, 64, 310.

Various considerations in the sensitometry of photographic plates are discussed by O. Bloch in a paper which was presented at the conference on the physical chemistry of the photographic process held by the Faraday Society in May, 1923. A new method of calculating fog is described and development control and its relation to accuracy in sensitometric work discussed. It is suggested that further work in sensitometry and standardization is necessary.

Physical Chemistry of the Photographic Process—obtainable from the Faraday Society, 10 *Essex St., Strand, London, W. C.*

In a paper on "How Should the Densities of Granular Silver Photographic Deposits be Measured," F. F. Renwick discusses the different meanings of the term density accord-

WIND-SWEPT.
(*Gum*)

M. N. BREMON.

ing to the use to which the negative is put, *i.e.,* for contact printing, enlarging, or projection. The writer suggests that parallel light be adopted as standard for density measurements for sensitometric purposes. *Brit. Jour. Photo.* 1924, 71, 65.

A flicker photometer using a photoelectric cell and suitable for the measurement of photographic densities has been designed by G. M. B. Dobson. Rays from the unknown light source, and from the standard source, fall on the same photoelectric cell intermittently, and a neutral wedge is adjusted until the needle of the galvanometer attached to the photoelectric cell remains constant. *Proc. Roy. Soc.* 1923 *A* 104,248.

A. L. Schoen describes a practicable method of using the thalofide cell to the measurement of photographic densities. Tests show that the apparatus devised is very efficient for the measurements of low densities which have heretofore been very difficult to measure accurately by visual methods.

J. Opt. Soc. Amer. 1923, *p.* 483.

W. B. Ferguson describes a new densitometer which is a modification of that described by him in conjunction with Renwick and Beeson in 1918. It is of the bench type, but of more manageable length, and with an improved comparison field secured by the use of a modified Abbe-cube in conjunction with a magnifying eyepiece. A new feature of the instrument is the fact that the illumination of the field remains constant regardless of the density under measurement. Searching tests have shown the instrument to be very accurate. As it is the fifth instrument of its kind brought forward by him, Mr. Ferguson calls it the "Ferguson Density Meter No. V." *Brit. Jour. Photo.* 1924, 71, *p.* 19.

A type of bench densitometer employing the inverse square law and designed especially for the measurement of exceedingly small areas from motion picture negatives or positives is described by Capstaff and Green. The instrument is of comparatively simple construction and will read densities up to 3 as accurately as any other type of densitometer.

Photo. Jour. 1924, 64, 97.

A density meter in which the density to be measured is placed in contact with a small hole in a hollow white sphere, the illumination of which is measured through a second hole in front of which is a Swan cube illuminated by the same

GIFTS OF SPRING.

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source of light as the plate is described by Bull and Cartwright. A calibrated wedge is used to alter the intensity of one of the beams of light while the area of the beam passing through the plate is controlled by an adjustable triangular aperture. *J. Scientific Instruments,* 1923, 1, 74. *Photo. Jour.* 1924, 64, 180.

F. C. Toy and S. O. Rawlin describe a photoelectric photometer employing a selenium cell. A single source of light is used, the two beams of light being converged by an optical arrangement so as to produce two adjacent half-circles. The density to be measured is placed in the path of one beam, and an accurately calibrated wedge in the other. The wedge is adjusted so that there is no deflection of the galvanometer needle when the selenium cell is moved from one of the illuminated half-circles to the other. The accuracy of the reading is claimed to be within one per cent.

Photo. Jour. 1924, 64, 189.

The relation of time and intensity has been investigated by F. Formstecher for printing out papers. It was found that the reciprocity law holds for pure silver chloride paper but not for papers containing a citrate. The time scale rises more slowly than the intensity scale with collodion self-toning papers. For the Schwarzschild exponent p a value of 0.82 is obtained. *Zeit. wiss. Photo.* 1923, 22, 116.

Experiments by Jones and Huse confirm the results of previous investigators that the reciprocity law where exposure equals the product of time and intensity does not hold over a wide range. The departure from a strict relation between time and intensity varied with different emulsions, Seed 23 showing the least and cine positive film the most. The Schwarzschild exponent p was calculated from the formula

$$p \frac{(\log I_1 - \log I_2)}{(\log E_2 - \log E_1) + (\log I_1 - \log I_2)}$$

J. Opt. Soc. Amer. 1923, 7, 1115.

ORTHOCHROMATICS

Luppo-Cramer has determined that the sensitiveness of plates dyed with pinachrome, pinacyanol, pinachrome violet and pinachrome blue is reduced if a soluble bromide is added to the dyeing solution. Similar results were secured with pinaflavol, but erythrosin was unaffected.

Further experiments showed that phenosafranine, amidol, metol and hydrochinone particularly in oxidized solutions act in a similar manner. *S. T. I. P.* 1923, 3, 58. *Photo. Ind.* 1923, *p.* 236.

A. Steigmann as a result of investigations on the action of sodium bisulphite and potassium carbonate solutions on chloro-bromide plates bathed in silver nitrate comes to the conclusion that the results secured in the Eastman Research Laboratory on panchromatic sensitizing with bisulphite are wrong. He claims that the effect varies greatly with different plates, and that in some cases there is actual desensitization.

Photo. Ind. 1923, 457.

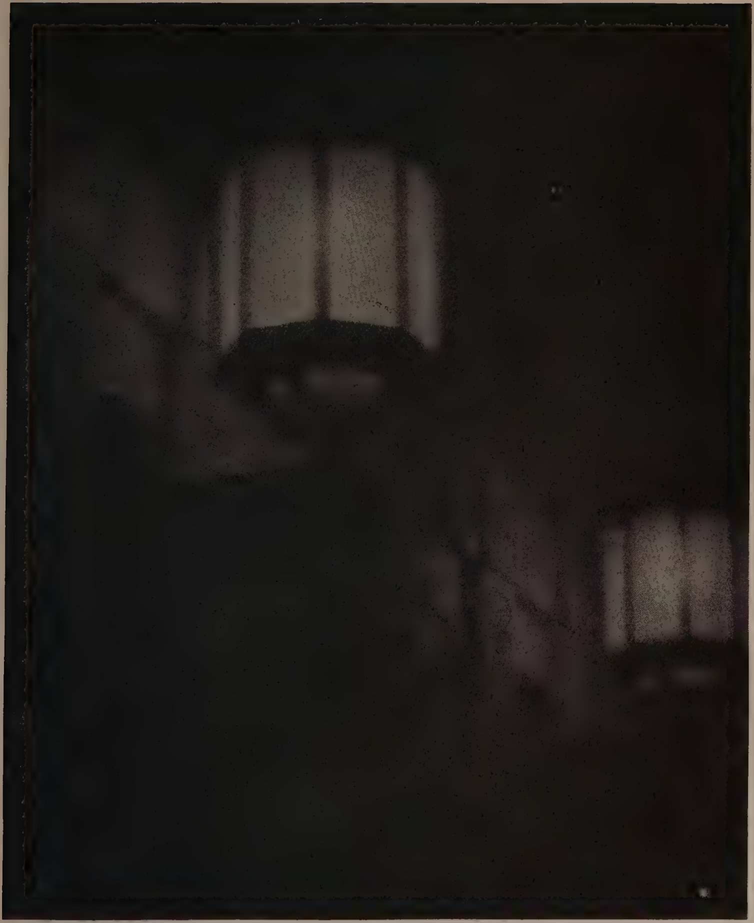
C. N. Bennett has described a series of experiments undertaken for the purpose of comparing the results given by self-screen plates, ordinary plates and panchromatic plates. He concludes that self-screen plates are unsatisfactory, and do not give much real orthochromatic rendering, and that panchromatic plates used without a filter are superior to the so called self-screen. *Brit. Jour. Photo.* 1923, 70, 269.

DEVELOPMENT

The influence of stirring on the rate and course of development has been investigated by Sheppard and Elliott of the Eastman Research Laboratory. An apparatus for the development of sensitometric strips is described and curves are given showing the effect of stirring on development with pyro, hydrochinon and metol developing solutions. It was found that the velocity of development is practically independent of the rate of stirring, except with pyro and metol, with which there is a slight increase in velocity at very high rate of stirring. The whole paper is of considerable interest to workers in sensitometry. *J. Frank. Inst.* 1923, 195, 211.

A graphic method of determining the velocity constant of development (k) and gamma infinity ($\gamma\infty$) has been published by F. F. Renwick. The method is exceedingly convenient and will doubtless be employed considerably in sensitometric work. *Photo. Jour.* 1923, 63, 331.

Dr. Luppo Cramer calls attention to some very curious phenomena in connection with dilute amidol developers. Sodium sulphite acts as an accelerator with amidol, of normal concentration, but as a restrainer with a very weak solution of amidol. A plain 1:100,000 solution of amidol develops in



THE NIGHT. T. OKAMOTO.

about five minutes with transparency plates, but if 1 per cent of sodium sulphite is added development does not take place. A 0.01 per cent solution of amidol with an equal amount of potassium bromide develops in a few minutes, but a solution containing 1 per cent of each destroys the latent image so that it cannot be developed with M-Q.

Photo. Ind. 1924, 6.

Pinnow has continued his researches in the action of sulphites in organic developing solutions. He finds that with hydrochinone, sulphite re-acts to form a colorless sodium salt of hydrochinone sulphonic acid, which is in turn oxidized by the latent image to form hydrochinone disulphonic acid which has no developing power. *Photo. Rund.* 1923, 60, 27.

King patents a compound of 2:4 diaminophenol with tin chloride as a photographic developer. *B. P.* 196, 672/22.

W. G. Christensen describes the preparation and developing properties of para-amino-*o*-chlorophenol hydro-chloride and N-methyl-p-amino-*o*-chlorophenol sulphate. Both are stated to be good developers, but neither is as good as metol (methyl-*p*-aminophenol sulphate). *J. Amer. Chem. Soc.* 1923, 45, 2192.

W. F. A. Ermen has found that in addition to blue tones a very satisfactory brown tone may be obtained by using as developers alpha naphthol and orthoamidophenol. Used alone orthoamidophenol gives a very satisfactory brown on transparencies and lantern slides, but the addition of alpha naphthol is necessary to obtain good tones on bromide papers.

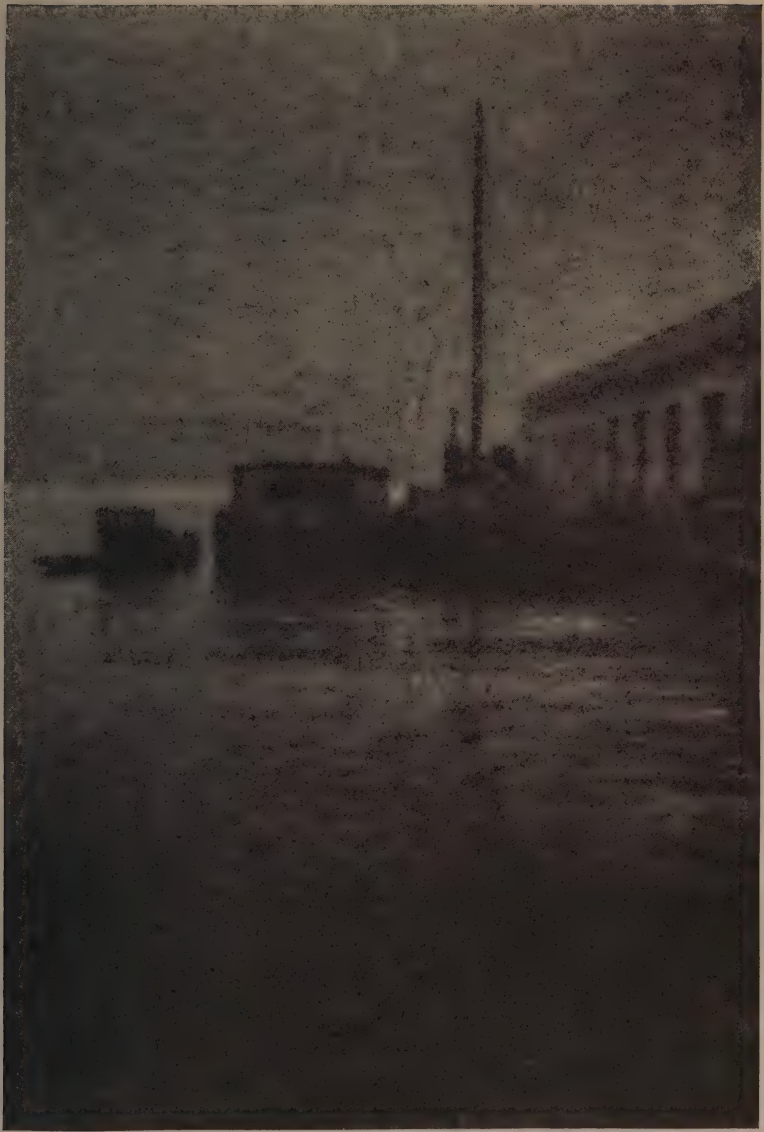
Brit. Jour. Photo. 1923, 70, 299.

FIXATION

According to Lumiere and Seyewetz fixation is complete as soon as the opalescent film of undeveloped silver halide on the back of the plate disappears. If the bath has been used previously, however, silver salts will remain in the emulsion and cause trouble. Prolonged fixation in such a fixing bath will not remove these traces of silver salts, but short immersion in a fresh bath will do so. The moral is obvious. Discard the fixing bath after having fixed a reasonable number of plates. The authors conclude that 100 cc. of a 20 per cent bath is sufficient for 5-6 plates 13/18 cm.

Rev. Franc. Photo. 1924, 5, 61.

The physico-chemical factors involved in the composition



ON A LAZY TIDE. EDWIN C. ARNOLD.

of the acid fixing and hardening bath are discussed by Sheppard, Elliott and Sweet in a paper to the Franklin Institute. The factors governing the choice use and blending of the various constituents and their function is discussed as well as the theory of the fixing process and some re-calculations of the amount of plate surface which may be fixed in a given quantity of fixing bath. *J. Franklin Inst.* 1923, 196, 45.

POSITIVE PRINTING PROCESSES

Some very interesting experiments on photographic printing processes employing bichromated colloids and pigments are outlined by Mr. T. P. Middleton in a paper in the *British Journal of Photography.* After reference to his own process now superseded by the Carbro method he discusses five different methods of sensitizing carbon tissue, and discusses the advantages and disadvantages of each. A paper which should be read by all using the carbon or carbro process.

Brit. Jour. Photo. 1923, 70, 735.

Stenger and Hertz give details of several positive printing processes for making reproductions without exposure to light. The gelatine film of the negative is tanned differentially by treatment with a bichromate followed by exposure to light. After this the negative is bathed in a metallic salt solution and placed in contact with another surface, which is subsequently treated with a solution which will produce a precipitate of the metal. Formulae and working directions are given.

Brit. Jour. Photo. 1924, 71, 75.

K. Jacobsen reviews previously published work on the use and preparation of silver iodide printing out papers. It is concluded that paper prepared by Johnson's method is suitable for tracings, plan work, etc., but is not suitable for photographic work. *Photo. Ind.* 1924, 152.

The well known pictorialist H. Kuhn has reviewed the various processes of multiple printing from the standpoint of pictorial work. *Photo. Rund.* 1923, 60, 40.

H. M. Cartwright has described some very valuable investigations on the sensitometric properties of bichromated gelatine. While having reference particularly to photogravure, the investigations also have an important bearing on the carbon and carbro processes, and form a useful addition to our knowledge of the properties of positive printing processes. *Photo. Jour.* 1923, 63, 265.

p. L.

TANKAI. SUZUKI.

J. M. Sellors has described a very comprehensive method worked out by him for calculating the time of exposure in enlarging on bromide papers. The speed of the paper used is determined by exposures under identical conditions with a neutral black wedge. The highest density of the negative having been found by measurement with a simple densitometer, such as the Sanger Shepherd Density Meter, the proper exposure under given conditions is calculated with the aid of an especial form of slide rule worked out to take into account such factors as the degree of enlargement, lens aperture, intensity of light source, etc. It is a very complete system but is, perhaps, too involved for most amateurs. Dr. Glover does not consider the method as accurate as that of making a preliminary test strip. *Brit. Jour. Photo.* 1923, 70, 349.
Glover—Loc. Cit. 375.
Sellors—Loc. Cit. 406 (*In Reply*).

Lumiere and Seyewetz point out that the time of fixation of developing papers under ideal conditions is much shorter than generally supposed being not more than thirty seconds, and often not more than twenty seconds. Those who may be inclined to adopt these times in practice, however, should remember that these times are sufficient only when each print is fixed in a separate and fresh bath of hypo. Provided prints are kept on the move so that each print is exposed to the action of the fixing bath, three minutes fixing in a 20 per cent bath of hypo containing 20 cc. of commercial bisulphite solution is sufficient. *Brit. Jour. Photo.* 1924, 71, 108

A. Callier recommends as a means of glazing prints without danger of sticking the coating of a plane sheet of heavy glass with a warm two per cent solution of gelatine. After being allowed to dry in a vertical position, the glass is coated with a solution containing 45 grams of collodion and 2 grams oil of vaseline in 1,000 ccs. of amyl acetate, again dried, after which it is ready for use. It can be used a number of times and without any danger of sticking whatsoever. Glossy print finishers please note. *Brit. Jour. Photo.* 1924, 71, 81.

J. Thompson has given revised formula with working directions for the Kallitype process. Those on the outlook for a distinctive printing process with small expense will do well to investigate Kallitype which of all processes most nearly approaches platinum, and at but a fraction of the cost of the latter. *Brit. Jour. Photo.* 1923, 70, 463.

DRIZZLY WEATHER. Edwin F. Casper.

Variations in gum bichromate are described in two papers by Schneeberger and Batty. "Gummists" might profit by a perusal of these. *Schneeberger—B. S. F. P.* 1923, 10, 162. *Batty—Photo. Jour.* 1923, 63, 398.

Some details of multiple gum printing are given in a paper in the *Bulletin of the Societe Francaise de Photographie* by F. Grandmaitre. *B. S. F. P.* 1923, 10, 16.

ENLARGING

A. Lockett in the *British Journal of Photography* gives details of a self focusing enlarging device which may be constructed by the photographer without a considerable outlay. The device is of comparatively simple construction, and could be easily constructed by anyone handy with tools. The same design could also be adapted to secure a self-focussing copying machine. *Brit. Jour. Photo.* 1923, 70, 760.

A. Lockett describes the computation of a focussing scale for the enlarging machine in order to avoid the operation of focussing. *Brit. Jour. Photo.* 1924, 71, 171.

A. Krug describes a number of excellent methods for speeding up the process of enlarging with apparatus of the horizontal type. A special type of easel is described which enables the bromide paper to be placed in the proper position for the exposure very quickly, and in the dim light of the dark-room. It is a paper which may be read to advantage by all using a horizontal enlarger, and who are called upon to deliver large numbers of enlargements in a very short space of time. *Brit. Jour. Photo.* 1923, 70, 568.

H. Zaepernick describes a self focusing enlarger which may be constructed by the photographer without a great outlay for materials or machine work. The raising of the easel is by rack and pinion in a slotted board which raises the lens in the proper manner. Methods of calculating the form of the slot are given together with other details necessary to properly construct the apparatus. *Brit. Jour. Photo.* 1923, 70, 475.

A. Lockett calls attention to the fact that the time of exposure for enlarging under given conditions with a certain negative is exactly the same as the time of exposure for a contact print from the same negative when the printing frame occupies the same position as the easel.

Brit. Jour. Photo. 1923, 70, 476.

TONING PROCESS

T. Andre describes a method of producing two-color prints by double toning. The print is first toned in the usual uranium toner, washed well and then immersed in a dye solution of the proper color. Following immersion in the dye solution the print is washed until the high lights are clear. Methylene dyes give the best results. *B. S. F. P.* 1923, 10, 348.

The relation between the exposure, development and the color and gradation of warm tone lantern slides has been investigated by T. Thorne Baker and L. F. Davidson. They find that generally the warmer the tone the lower the contrast or gamma. Pronounced colors are more easily secured on ordinary black tone gaslight lantern plates than with the softer working more rapid brands often advised for warm tone work, as the latter tend to give less contrast than the former for the same color. It is concluded that the gaslight type of plate should be used with normal negatives, while the faster plate should be used in dealing with contrasty negatives.

Brit. Jour. Photo. 1924, 71, 77.

P. Strauss has published a number of formulas for toning with cobalt. The following stock solutions are given:—

1. Cobalt sulphate 10 per cent solution.
2. Potassium ferricyanide 20 per cent solution.
3. Potassium citrate 10 per cent solution.
4. Ammonium citrate 20 per cent solution.
5. Citric acid 10 per cent solution. For violet tones: Water 80 cc., 1.2 cc., III. 15 cc., V. 0.5-1 cc. II. 0.8 cc. For red tones: Water 75 cc., 1.2 cc. III. 8 cc., IV. 12 cc. After toning wash print for ten minutes in running water and immerse for one minute in water 100 cc., 5 per cent chromic acid, 2 cc., strong hydrochloric acid 10 drops. Finally wash in water, until the chromic acid is removed. For a sepia the print is treated with a 5 per cent solution of sodium sulphide before the chromic acid bath.

Brit. Jour. Photo. 1923, 70, 352.

R. W. Richardson has given formulæ and directions for toning with tin. For bleaching a solution obtained by neutralizing a solution of ammonio-copper sulphate with hydrochloric acid is used. The bleached print is immersed in a solution consisting of 1 ounce of a 1:32 solution of tartaric acid

“SHINE, SUN! ROLL, WAVES!” LOUIS A. GOETZ.

treated with 4 grams of stannous chloride and 25 per cent solution of caustic soda which is added until the stannous salt is dissolved and the solution rendered slightly alkaline. For more complete description the original should be consulted.

Amat. Photo. 1923, 55, 469.

Luppo-Cramer has found that stained whites from toning with uranium may be cleared by the use of a neutral salt such as sodium sulphate. The staining may be avoided by toning in a single bath, the ferricyanide concentration of which is low and not acidified. The addition of sodium sulphate to the toner is without effect. *Camera* (*Luzerne*) 1923, 2, 159.

N. L. Allport recommends in place of the usual formulæ for bleaching for use with the indirect process of sulphide toning an iodine-bromide bleacher consisting of 1 part of a 10 per cent solution of iodine in alcohol to 15 parts of a 10 per cent solution of potassium bromide.

Amat. Photo. 1923, 55, 407.

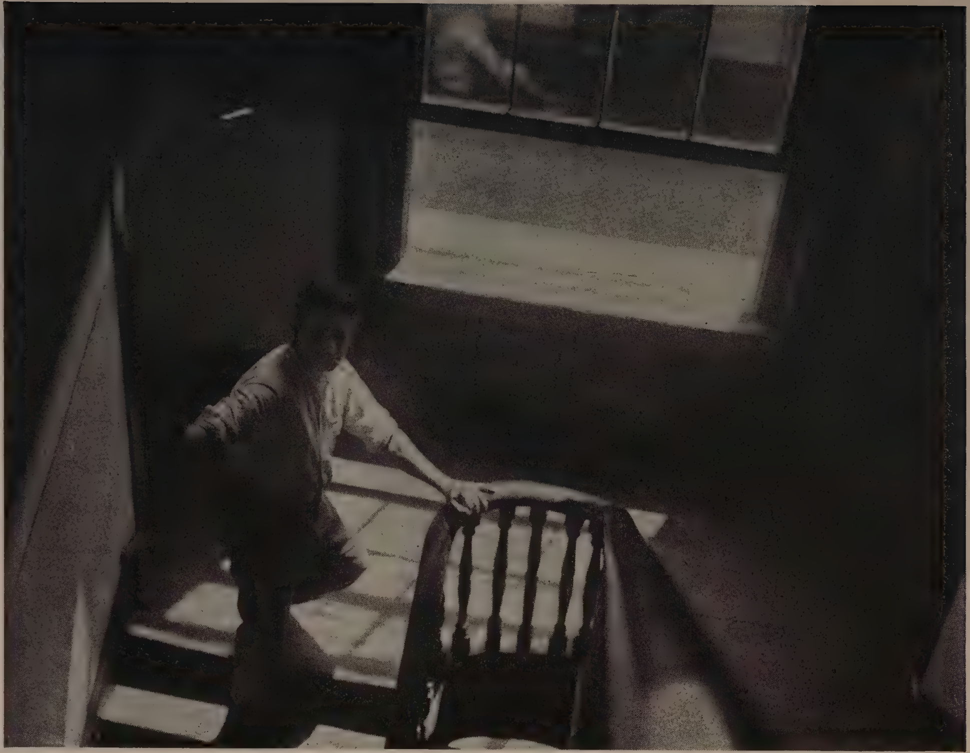
MISCELLANEOUS

W. H. Heydecker revives the old Playertype process for copying drawings, engravings, pages from books, etc., without the use of a camera. A contrasty working, non-orthochromatic plate or film is placed face down on the surface of the subject to be copied and over this is placed a red filter. Upon exposure to light the difference between the density due to the direct light, and that due to the additional light reflected by the white portions of the paper, produce the necessary contrast. Usually it is necessary to intensify the negative in order to get sufficient contrast. *Brit. Jour. Photo.* 1923, 70, 445.

Bunel recommends the following method of intensifying or reducing with chromium. The negative is immersed in

2 per cent chromic acid solution..........	40 cc.
10 per cent potassium bromide solution......	4 cc.
Water to make	100 cc.

In this it assumes a brick-red color. Upon removal it is washed in running water and followed by a 5 per cent solution of sodium sulphite containing a trace of sulphuric acid or sodium bisulphite. For strong intensification the negative is then developed preferably in amidol, although pyro without sulphite may be used. To intensify the shadows while reducing the high lights develop in amidol until the red color



THE HALLWAY. DR. ARTHUR NILSEN.

vanishes from the desired portions, and place the plate in 5 per cent hypo to reduce the blacks. Finally replace in the developer to which 1 per cent carbonate has been added. Develop 10 minutes and wash. *S. T. I. P.* 1923, 3, 123.

E. Muller describes the use of a weak solution of a red dye, Coccine Nouvelle, for softening hard shadows in negatives of contrasty subjects. A weak solution of the dye is applied locally to the desired portions with a brush and if the first application is insufficient a stronger solution may be applied. If for any reason the result is not satisfactory the whole of the dye may be removed by washing the negative in running water. *Brit. Jour. Photo.* 1923, 70, 381.

Winterton recommends the use of Erythrosin in place of the Coccine Nouvelle recommended by Muller.

Amat. Photo. 1923, 55, 316.

O. Fielitz describes a method of dealing with a long scale subject. Two negatives are made without moving the camera. One is exposed for the shadows and developed to give the maximum contrast. The other is exposed for the high lights and developed softly. The paper is exposed behind the shadow negative until the shadows are properly printed, and then registered and printed on the high light negative for the high lights. *Photo. Rund.* 1924, 61, 37.

H. Hinterberger recommends a rather old process of dealing with under-exposed negatives. The negative is bleached in a suitable bleacher, such as that used for intensification with mercury, and the bleached negative re-photographed, the bleached image being backed up with a black ground.

Photo. Ind. 1924, 115.

E. Stenger in the German journal of the cinematograph industry, *Kinotechnik,* reviews the processes of reversal which have been introduced from 1862 to date. The recent introduction of the Cine Kodak with its direct positive film has increased the interest in reversal processes so that Stenger's review comes at an opportune time. *Kinotechnik* 1923, 5, 341.

In a paper to the *British Journal of Photography,* E. R. Bullock discusses the chemistry of the chemical re-actions involved in the Kodachrome bleaching process as applied to the inversion of photographic images in the Cine film.

Brit. Jour. Photo. 1923, 70, 491.

MOTHER AND CHILDREN. DOROTHY JARVIS.

Two methods of testing the efficiency of shutters are described by H. Naumann. One method consists in photographing the aperture of the shutter by means of a revolving crown of mirrors on a film wound around a drum. In this way up to 1,200 images per second can be obtained, and the exact time required for opening and closing, and the actual duration at full opening can be determined. Rather involved for individual testing, but perhaps of value to manufacturers, dealers or others who have occasion to test shutters regularly.

Z. Wiss. Photo. 1924, 22, 214.

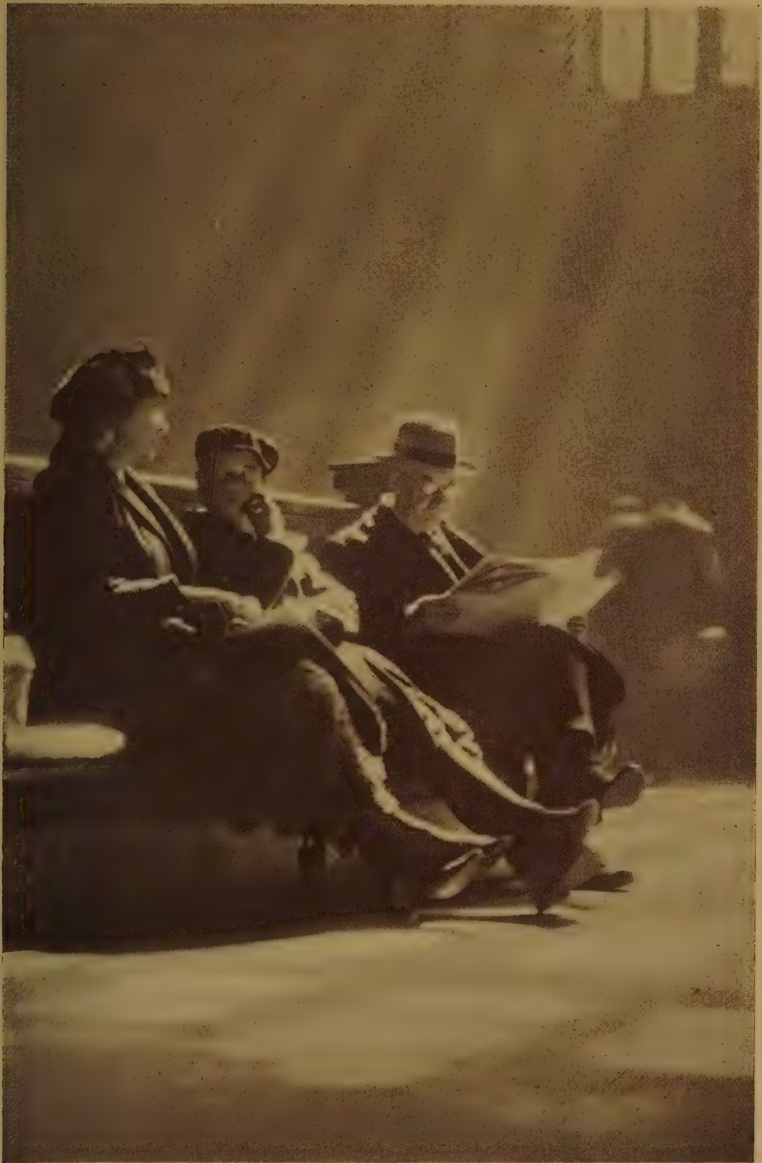
Dr. Luppo Cramer recommends as a means of restoring plates, which have become slightly fogged as a result of long keeping the use of a 1:2000 solution of paraphenylenediamine hydrochloride. After bathing for five minutes the plates are washed in running water for ten minutes and dried. It is claimed for this method that there is no reduction in sensitiveness as has been the case with the methods previously advised for this purpose. *Photo. Ind.* 1923, *p.* 311.

J. I. Crabtree and G. E. Mathews, both of the Eastman Research Laboratory, have examined the effect of developing and fixing solutions on various materials. No metal is really satisfactory for developing solutions while copper, tin, or alloys containing the same, cannot be used owing to fog. No metal has been found which is really suitable for fixing solutions but lead, nickel, monel metal, type metal and Resistal steel were found to be fairly satisfactory. Attention is called to the advantages of substances such as enamelled steel, glass, rubber, etc. *Brit. Jour. Photo.* 1923, 70, 366, 385.

R. E. Cummings gives the following formula for determining the time of exposure allowable for moving objects. Where D equals the distance of the object in feet, F, the focal length of the lens in inches and S, the speed of the object in feet per second, the formula for exposure is represented by Exposure D/100 F/S. *Brit. Jour. Photo.* 1923, 70, 447.

The Progress Medal of the Royal Photographic Society was awarded to Alfred Stieglitz for his work in the development of pictorial photography in America, and his initiation and publication of *Camera Work.*

The Societé Francaise de Photographie has awarded two of its medals to Dr. C. E. K. Mees and W. F. Ferguson in



WAITING FOR THE TRAIN. Dr. J. B. Pardoe.

appreciation of their contributions to the science of photography.

Among the deaths of the year should be mentioned that of John Sterry, one of the old workers in photography, and an Honorary Fellow of the Royal Photographic Society. He was one of the few who saw the practical importance of the work of Hurter and Driffield at that time, and in his *Photography by Rule* did his best to bring the work of these investigators to the attention of the average photographer. His papers on the effect of various substances on the latent image also constitute a valuable addition to the literature on that subject. His death occurred May 6, 1924, in his 81st year at Kulbari, Blackwood, South Australia.

WHERE THE PADRES SLEEP. EDGAR A. COHEN.

A SIMPLE METHOD OF GUM PRINTING

By VICTOR S. MATSON

GUM bichromate printing is a worthwhile process. A good gum print is a pleasure to look upon, and furnishes a keen sense of satisfaction to the producer. A poor one is not a disappointment, but an incentive to do better.

The difficulties attending the making of a successful print have been enumerated until they appear to the prospective worker as an unconquerable giant. I once heard a pictorialist say that he would make gum prints if they could be made in the ordinary kitchen-mechanic way. The method I will describe requires only the use of a few utensils to be found in any kitchen, with the exception of two brushes, a varnish brush about two and one-half inches wide, and a badger blender.

The medium for the pigments is gum arabic. It will be found to be more convenient, and more uniform results can be obtained by using mucilage. Sanford's Royal Crown mucilage seems to have the proper consistency for the best results when diluted with the bichromate solution. The standard coating mixture is very simple. Pour out two teaspoonfuls of mucilage into a sauce dish. Into the mucilage squeeze an inch of moist water color pigment from a tube. The moist colors are more convenient to handle than dry colors. Mix the pigment and the mucilage together thoroughly with an ordinary water color brush, then add three teaspoonfuls of a saturated solution of potassium bichromate. Mix thoroughly and strain through a coarse piece of cloth. This will remove any particles of pigment which are not carried in suspension in the mucilage. Coating of the paper is done in the usual manner, in a darkened room. The varnish brush is used to apply the coating, which should be fairly uniformly distributed. The brush should be soaked in water a few minutes, and the excess water squeezed out before dipping into the coating mixture. It should be charged with just enough solution to give a thin coating. The use of the badger blender will make the coating sufficiently uniform. The use of papers

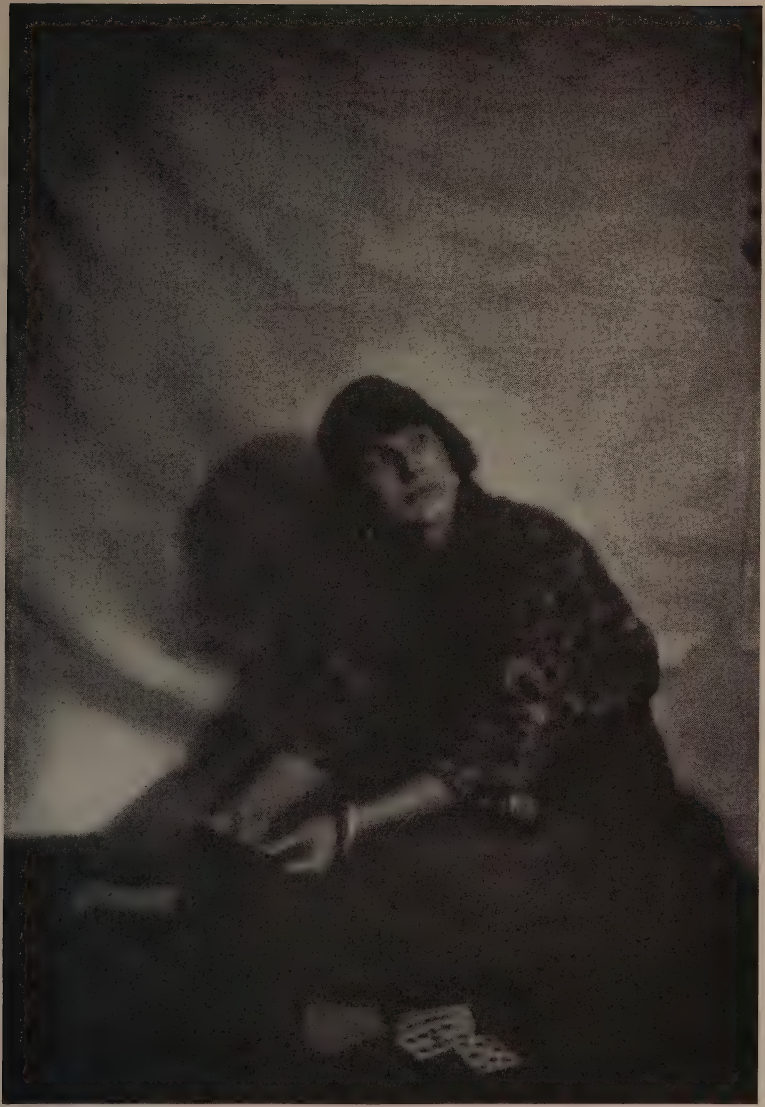


Figure 1.

FORTUNES—THREE PRINT MULTIPLE GUM.

Illustrating article "A Simple Method of Gum Printing," by Victor S. Matson.

of a coarse texture also make the application of the coating easier.

A good charcoal paper gives very satisfactory results. Most papers require sizing. For multiple printing, the paper must be shrunk. This is accomplished by soaking in water for a half hour and drying previous to sizing. The sizing coat does not dampen the paper sufficiently to shrink it. The most satisfactory sizing material is gelatine. A formula can be found in *Pictorial Photography, Its Principles and Practice,* by Paul Lewis Anderson.

Cold Water	4 oz.
Gelatine	60 grains

Allow the gelatine to swell for five minutes and then heat, preferably in double boiler until dissolved. Add a little at a time, with constant stirring—

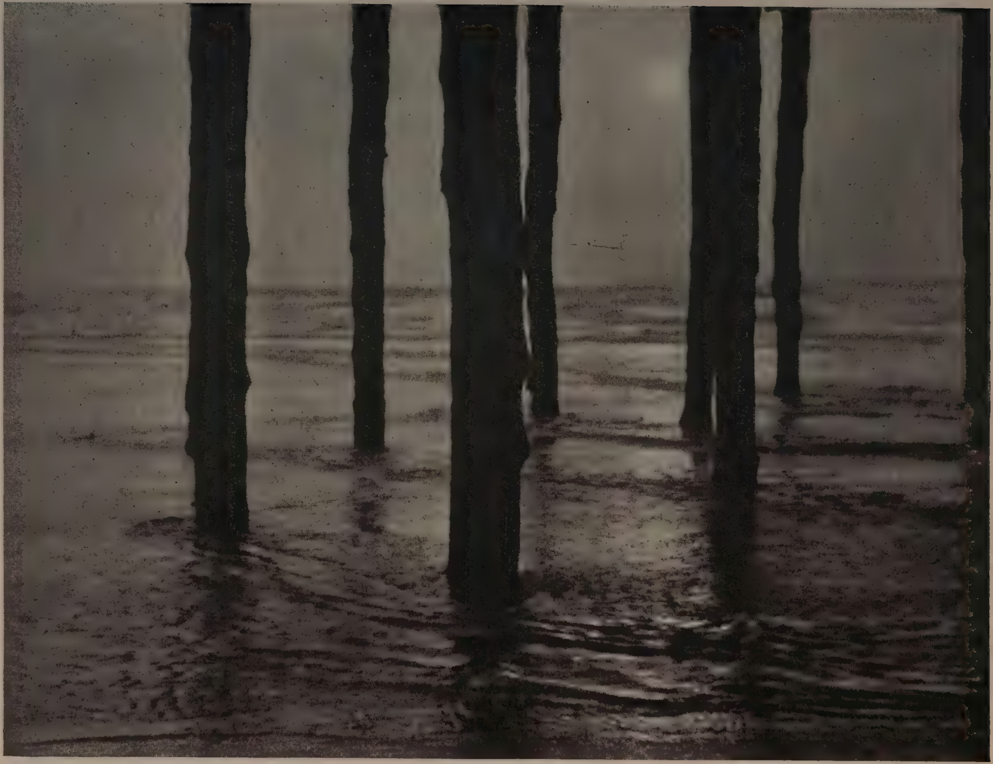
Hot Water	4 drams
Chrome Alum	12 grains

Apply the gelatine size to the paper with a sponge, while still hot. If the mixture is inclined to be somewhat stiff and jelly-like, it must be rubbed into the paper with the sponge to obtain an even coating. Both sides of the paper should be sized to prevent curling.

About three printings are required to give a rich gum print. The first printing should be long enough for the sunlight to produce a tint in the highest lights. The second should be for details in the middle tones, and the third for details in the shadows.

Development is carried out by floating the printed paper face down in a dish of water, allowing the unexposed mucilage to dissolve out and carry the pigment to the bottom of the dish. When development is complete, that is, when no more gum will wash off, the print should be immersed in a concentrated solution of white alum, to remove the yellow bichromate stain from the image. It should then be rinsed off and laid out in the sun to dry. It will dry quickly in the sun, and thus fix the emulsion from further development. If too much of the color comes off in the alum bath it is well to dry the print before immersion.

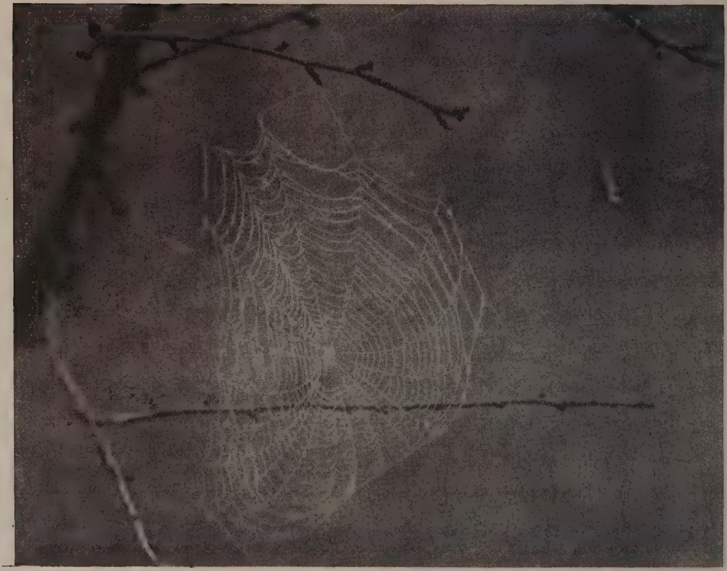
A variety of pigments may be used. The stronger colors are found to be most satisfactory. Rembrandt black, manufactured by Talens and Sons, produces a pure black print.



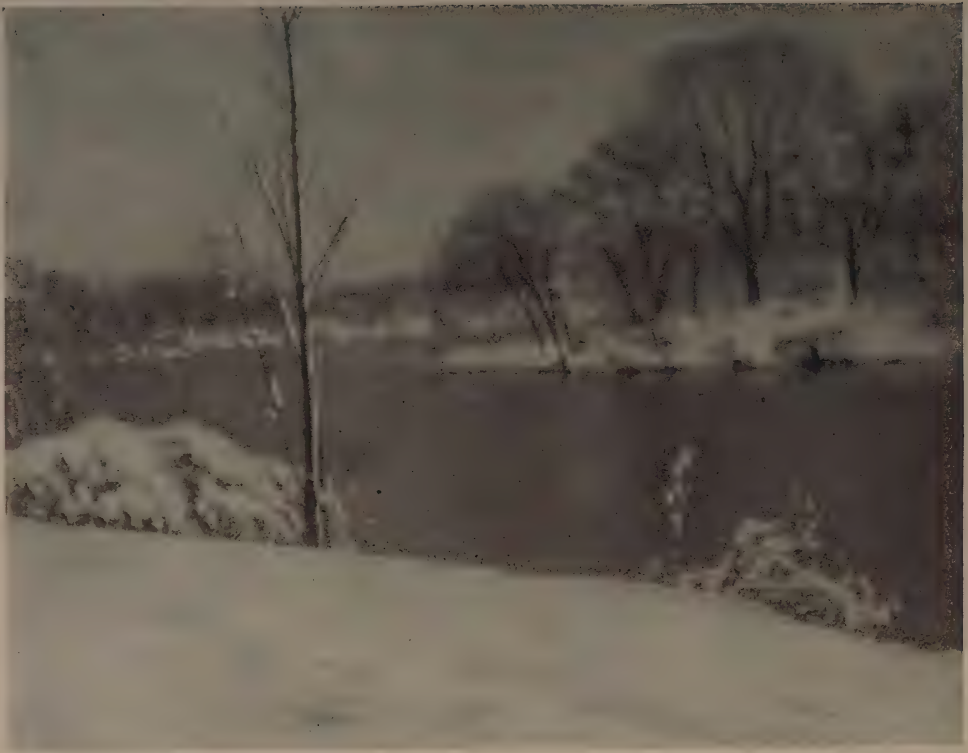
MORNING SUN. JOHN ALLEN.

Winsor and Newton's ivory black and lampblack give respectively, warm black and greenish black tones. Payne's gray gives a very pleasing blue for marines, when combined with a shadow printing of Rembrandt black to give it strength.

Some of the harder papers will take more pigment than the softer, without staining. A little experimenting will acquaint the worker with this fact, and he can vary the proportion of pigment to mucilage to produce the results desirable. It will be found that by this rough and ready method of mixing up the gum, it will be quite possible to make a batch of three coat multiple gums in one afternoon. The illustration accompanying this article (Figure 1) is a three-coating multiple print.



CHAS. W. DOUTT.



DAMP AND COLD. FLOYD VAIL, F.R.P.S.

AFTER-WORK ON THE PRINT

By A. C. FLAGG

THE idealist will say: "But there should be no need for after-work." Quite right, but alas! we are human; defects will appear, and it is astonishing how much could be done to improve even some of the best exhibition work by careful, unnoticeable spotting. By spotting we mean the elimination of both dark and light spots, scratches, and other blemishes on bromide or gaslight prints.

It is an Irishism, but much of the afterwork on the print is best done on the negative. That is to say, pinholes, scratches, etc., which print dark should be blocked out with opaque paint on the negative so that they print white. If this has not been done, however, they can easily be treated on the print. Solution A (page 52), clean hypo solution, and a small brush are required. Mark the brush, as it is for use with solution A only.

Place the dry print on a board, sheet of glass, or some other level surface; dip the brush in the solution A, drop a tiny blob on the pinhole and let it remain there. Always commence on the left of the print and work towards the right in order that the liquid does not get smudged over the print. The black will gradually disappear leaving a greenish stain. Do not blot off the superfluous moisture, but slide the whole print carefully into a dish of clean hypo solution of ordinary strength. After about ten minutes wash thoroughly and dry.

Long scratches or telephone wires are best dealt with in a series of little dots, as it is difficult to cover a fine line with the brush. For small pinholes a very useful tool is easily made. The point of an ordinary fine sewing needle should be pushed into a wooden pencil or spindle, and the eye snapped off leaving about ¼″ sticking out from the wood. If this is dipped into the solution a very minute globule can be dropped upon the offending pinhole or spot.

When the print is quite dry we can proceed with the filling in of the white spots, blemishes, and even small high

THE BASHFUL BOY. CHARLES H. BROWN.

lights which scatter the interest. Matte, semi-matte, or velvet papers are the most suitable for working upon, and if much afterwork is to be done it is an advantage to print or enlarge the photograph with a white margin.

The untrimmed print should be pinned to a board or temporarily mounted by its edges only on a sheet of firm cardboard. We take a small piece of cotton wool, and dipping it in solution B (page 52) rub it gently over the surface of the print; it will dry in a few moments.

For the spotting proper we require:

A sable brush.
A palette
Artists "stumping powder," black or brown.
Solution C.
A small jar of clean methylated spirit.

The brush should be a water colorist's sable—not too fine but with a nice point—the small photographic spotting brushes are apt to make the print look worked upon. An ordinary negative glass cleaned, and with white paper underneath, makes a suitable palette.

A little of the powder is mixed to a cream with a few drops of solution C (page 52) and spread out on the palette to dry. Dip the brush in solution C and work it on the palette until the required tint is obtained. By using a lot of the color and a little liquid we can match the deepest shadows, and by increasing the liquid lighter tones can be obtained until we can match the lightest shade of gray or brown on the print. (This is where we score over chalk or pencil.) The white margin is most useful for matching the tone—if there is no margin the color should be tested on another piece of the same printing paper, as the result varies with different kinds of surfaces.

It is difficult to describe the actual method of work, but a little practice on spare print will soon reveal the right amount of moisture required to spot unnoticeably—the brush, charged with a little color, should be neither wet nor dry, but *damp*. The spots, etc., are then carefully filled in to match the surrounding depth of tone.

No subsequent treatment of the print, such as waxing or varnishing, is necessary or advisable, but if much work has been done steaming can be employed with success. The work

WIRELESS TOWER AT ARLINGTON. A. C. G. ALLISON.

is best done in daylight if possible. Any misapplied color can be readily removed with cotton wool and clean methylated spirit—the latter is also used to clean the brush.

Bald skies, or large areas, which require to be slightly darkened can be dealt with by means of a small pad of "piano felt" and a block of old-fashioned household black lead; but the greatest care is needed, as an extraordinary amount of lead is deposited with very slight rubbing (an experiment on a piece of paper, partly covered with another piece, proves this). But a very light deposit on a "bald" sky is an immense improvement, and if desired clouds can be made with a piece of artist's plastic india rubber. The felt and lead are sold in a "Novlart" outfit which is most useful for the purpose.

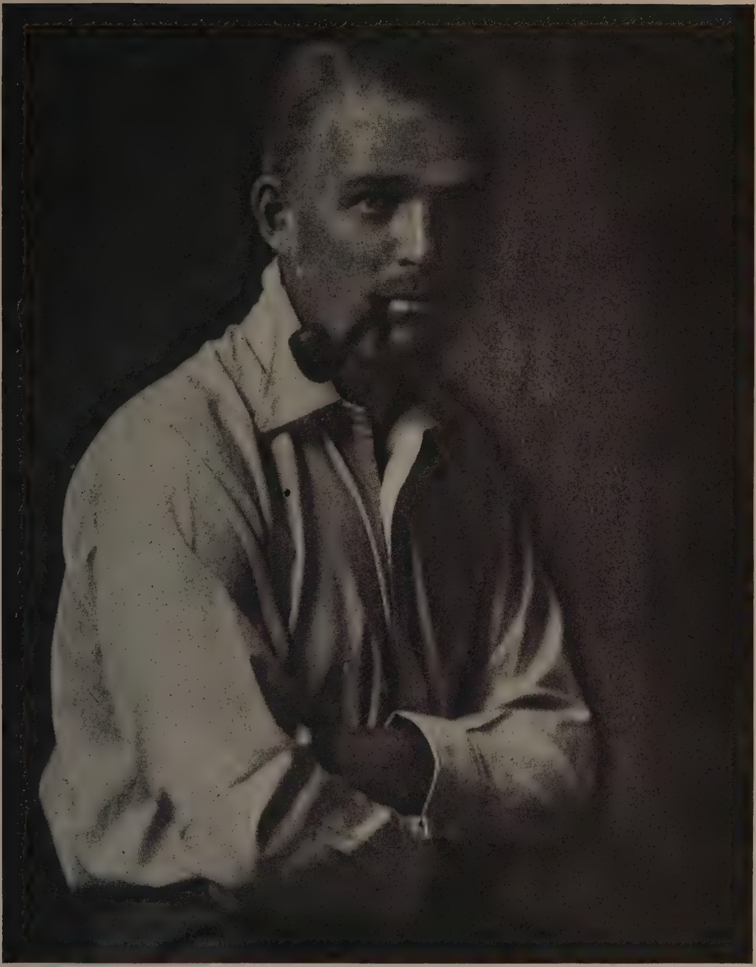
Large areas can be reduced in tone by means of Mr. Greenwell's spirit and iodine reducer; but this is a difficult matter, apart from the extremely poisonous nature of the agent, and is best left to the very advanced worker.

The formulae for the solutions required are as follows:

Solution A	Copper sulphate	40 grains
	Potassium bromide	40 grains
	Water	1 ounce
Solution B	White dextrine	10 grains
	Chloral hydrate	10 grains
	Warm water	1 ounce

When dissolved add ¼ oz. methylated spirit and a few drops of preservative (oil of wintergreen or cloves).

Solution C	Chloral hydrate	40 grains
	Methylated spirit	1 ounce



PORTRAIT. LIONEL WOOD, F.R.P.S.

PLATINUM PAPER FOR PORTRAITURE

By PAUL L. ANDERSON

WHEN considering the selection of a printing paper for use in regular portrait work, the first conclusion which presents itself is that the so-called "control processes," that is, those admitting of manual variation of values at the time of printing, are not so generally necessary as they are in landscape work. It is the writer's firm conviction that a straight photograph—one in which no personal control on the part of the artist exists—is a purely mechanical thing, possibly attractive to look at, but carrying no great artistic expression. But in portraiture the first aim must always be to secure a characteristic likeness of the sitter, and for this reason the artist's control should in general be confined to pose, expression, lighting, and background; the writer holds that no control beyond these is ever desirable in this branch of photography. This, then, limits the photographer's control during printing to the background, with the possible addition of a shadow to subdue details of costume, or figure, or to draw the entire picture into harmony with the features or figure.

Now, when working in a well-appointed studio, or even in the sitter's home, there are almost unlimited opportunities for arranging pose, lighting, and background in a harmonious manner, and this is doubly true if the work is being done by artificial light, when practically any desired illumination may be secured in any portion of the picture. In landscape, it will be noted, the only changes of illumination possible are through choosing the time of year, the time of day, and the kind of day, and if these do not suffice, then that particular scene must be abandoned in favor of one more amenable.

In portraiture, too, the possible alterations of pose, expression, and background are infinite, but one cannot ask a tree to step out of the picture, or to arrange itself differently, or a mountain to resolve itself into a cloud. Or, rather, one can

NIGHT. H. J. CAMPBELL.

ask them to do so, but with the result that Hotspur implied as to Glendower's calling spirits from the vasty deep—"But will they come, when you do call to them?" The control processes enable us to assure the coming of the spirits when they are summoned.

So far as texture is concerned, this is of slighter importance in portrait work, where the fundamental aim is to secure a gratifying likeness, than in landscape, where the texture is a decided aid to the expression of a thought. It is by no means to be despised in any case—far from it—but in portraiture, if we have a print texture which is inherently pleasing, there is no need to strive for a definite textural quality in the picture, apart from that afforded by the surface of the paper used.

We see, therefore, that the portrait photographer, being able to arrange his picture very largely to his liking before making an exposure, need concern himself much less with manual control than the landscape worker, and that what control he does need may be secured by shading the printing-frame or, in extreme cases, by the use of a pencil on a coating of ground glass substitute, or a sheet of tracing paper stretched over the negative. Further, in portrait work it is desirable—unless the conditions are very unusual—to have the power of duplication, and this is far from easy when manual control is employed; indeed, in many cases it is impossible to repeat a success in gum or oil.

It remains, then, to consider what paper, limited as to manual control, affords the greatest number of advantages; or, to put it differently, what paper offers the greatest number of advantages to offset the slight loss of which we have spoken. Each kind of printing paper has its merits and its disadvantages; carbon offers variations of color and ease of multiple printing, with, to set against these, a lustrous surface; oil and bromoil are not easy to work, and duplication in these mediums is extremely difficult; gas-light and bromide papers may be handled rapidly, but lack a pleasing surface texture, and unless great care is used their permanence is doubtful. Platinum paper, however, offers ease of handling, stability of the image, an ample range of color for portraiture, a pleasing surface texture, power of duplication, and sufficient chance of control to meet all requirements, and for this

OCTOBER MORNING. O. C. Reiter.

reason the writer feels it to be the best for general use; when only one print from a negative is desired, bromoil remains his favorite.

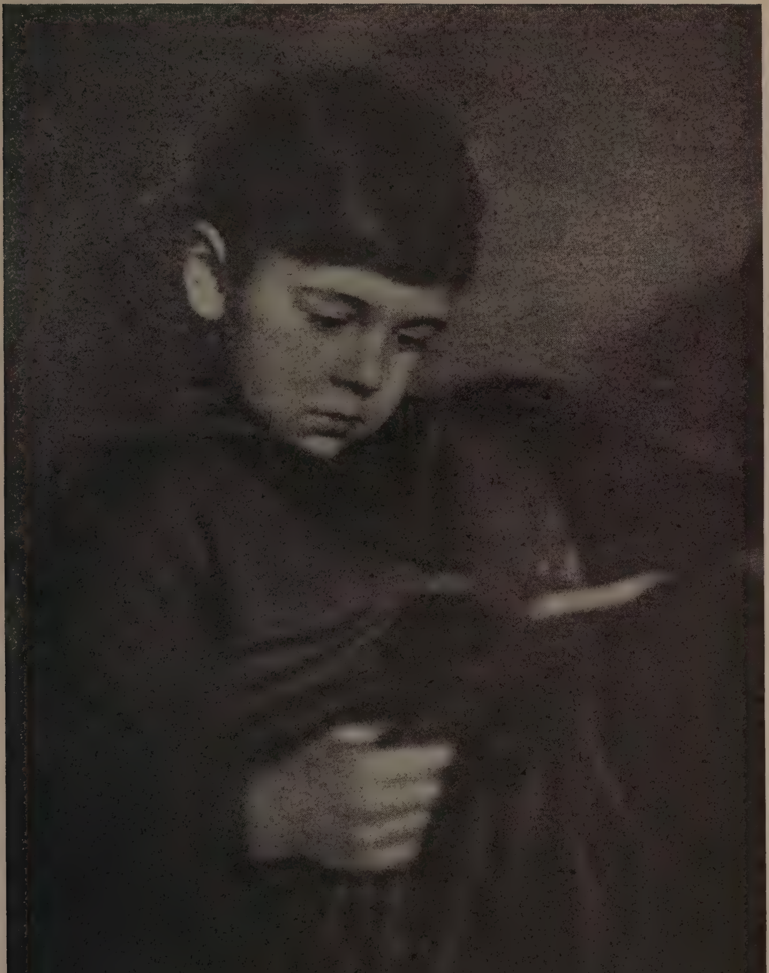
Platinum paper has fallen into disrepute among professional photographers, partly by reason of cost, and partly on account of the relative slowness of handling as compared to gas-light papers, which latter, being printed in a few seconds by artificial light, can be worked much faster—and the genius of America, whether in portraits or motor cars, seems to lie in the direction of quantity rather than quality production. But for the amateur or the high-class professional, who prefers a few fine prints to a mass of indifferent ones, platinum has much to recommend it.

In the first place, all gelatine-surface papers show an image which is held on the support in a lustrous or semi-lustrous coating, but in platinum the image lies within the pores of the paper, thus allowing the texture of the latter—often beautiful—to be seen. Then, too, a good platinum paper has a longer range of tones than a gas-light, this advantage manifesting itself chiefly in the lower register; so far as the lighter tones are concerned, gas-light will render them as well as any medium. In the next place, platinum is more stable and less liable to trouble than gas-light; extremely casual handling produces satisfactory platinums, but there are great possibilities for staining and for fugitiveness in any silver paper. Further, variations of total contrast are more easily attained in platinum than in any other paper except oil and carbro. Still further, variations of color are—within the desirable limits—much easier to secure than with gas-light paper. And finally, if an extremely rich quality and great shadow depth are desired, these may readily be attained by adding a printing of gum to the finished platinum print; to add a printing of gum to a silver print is no easy matter.

When we come to the actual working of the process, we find that platinum is by far the easiest to handle of all the finer mediums; in fact, blue-print is its only rival in this respect. It is commonly stated that platinum requires a strong negative, but this is the case only when the full scale of tones of the paper is to be employed; either high-keyed or low-keyed prints may readily be made from a soft negative—and, of course, prints in the middle register as well—with excellent effect; it is, however, true that for a given degree of contrast the negative should be somewhat stronger than if gas-light or carbon paper is chosen. Strong prints can be got, though, from a soft negative without loss of quality; the method of doing this will be described later.

Printing must be done either by sunlight or by a strong artificial light—a Cooper-Hewitt is excellent for the purpose—and since the image partially prints out the timing may be done by inspection. Inspection, however, is not accurate, and fails badly in the case of a thin negative from which a high-keyed print is to be made, so that the writer always prefers to print by time, making and developing a test slip and adjusting the timing according to the result of this test. A thin negative, to be printed in a high key, may require not more than twenty seconds in bright sunlight; an average plate, exhausting the scale of the paper, will demand perhaps five or six minutes; one which takes fifteen is too dense, having been either over-exposed or over-developed, or both. Since the paper is very sensitive to moisture, it is well to proceed with development as soon as printing is complete, though in dry weather this is not imperative; there is no "continuing action," as in gum and carbon, but muddy prints will result from the absorption of dampness from the air.

The fundamental developer is made by dissolving a pound of neutral oxalate of potash in forty-eight ounces of hot water and allowing it to cool. This will give neutral black tones. If a cold black is desired, dissolve three ounces of the oxalate, and one ounce of monobasic potassium phosphate, in sixteen ounces of water, this developer requiring a trifle longer printing than the former. For warm tones, up to a sepia, add bichloride of mercury to the fundamental developer, beginning with twenty grains of the mercury salt to sixteen ounces of the developer and increasing the amount if warmer tones are desired. The writer prefers this method to using the regular sepia paper, for two reasons. First, the degree of warmth is accurately under the operator's control; second, there is no loss of richness in the print, whereas the shadows on the sepia paper are apt to be thin. All of these developers keep indefinitely and may be used repeatedly; in fact, there appears to be a slight gain in richness with a used developer. Care should, however, be taken to pour off only the clear



WALTER BRYANT HERVEY.

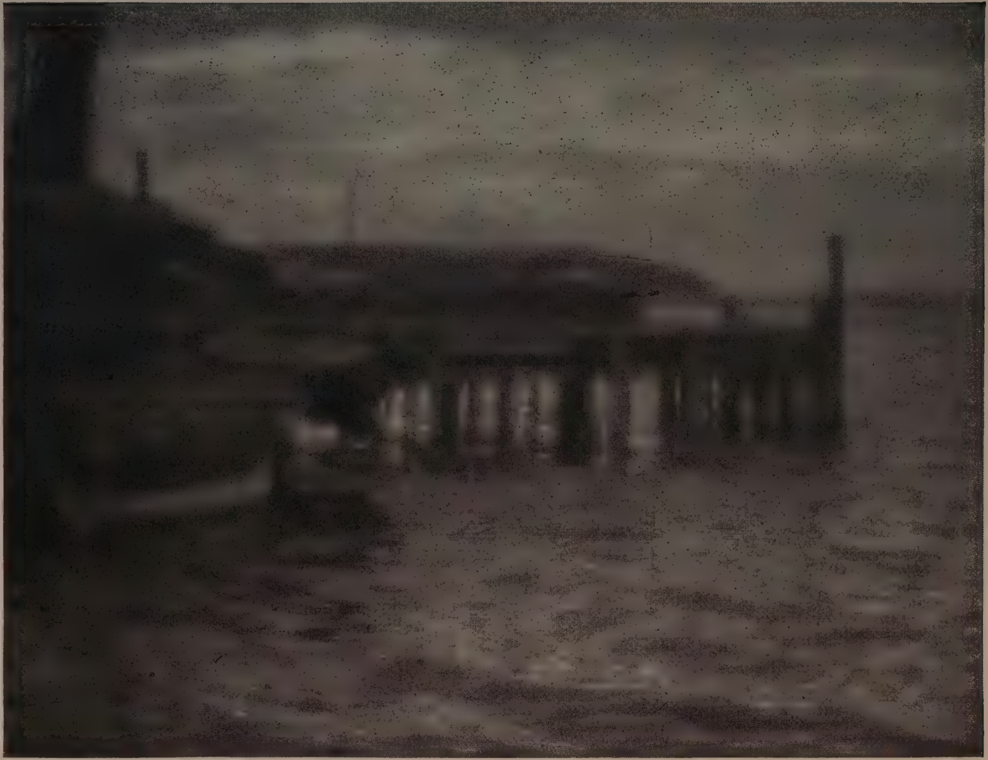
ANTOINETTE B. HERVEY.

solution from an old developer; if any of the sediment is included there may be streaks and spots on the print.

Development is accomplished by sliding the print, face up, into the developer and allowing it to remain for about three minutes, or until the action is complete. The tray should be rocked during development, and any air bubbles forming on the print should be broken with the finger. Development being complete, the print is removed to a tray containing the clearing bath, which consists of one ounce of c. p. hydrochloric acid in three hundred ounces of water. Here it remains, with occasional rocking, for about five minutes, then passes to a second clearing bath like the first, and finally is washed for ten or fifteen minutes in running water and hung up to dry. There is no danger of staining or blistering, and but little chance of insufficient fixing or washing, so it will be seen that the process is far simpler than gas-light or bromide printing, not to mention carbon or oil. Care should, however, be taken not to rub the prints with the finger while they are wet, or to allow them to rub too roughly on one another, or abrasion of the surface may occur.

Increase of contrast may readily be secured; decrease of contrast is more limited in its possibilities. If a normal print from the negative is too strong, a softer one may be secured by light printing and the use of a warm or even a hot developer, up to boiling. The time of printing is dependent on the temperature of the solution, so for accurate results a watch and a thermometer must be employed; the hotter the developer, the shorter the printing and the softer the print. Also, the warmer the color of the finished print, so this method is not applicable to prints in which a cold or neutral tone is desired. In using a warm developer, great care must be exercised to flow it over the print with an even, unhesitating sweep, or development marks will surely result. The addition of a trifling amount—one or two drops—of hydrochloric acid to the developer will also give softer prints.

To increase contrast the developer is sometimes diluted with water or glycerine, up to five parts of the diluent to one of the developer. The writer prefers, however, to accomplish this result by the addition of potassium bichromate to the developer, since this does not tend to impair the quality of the print—dilution if carried too far, gives granularity—

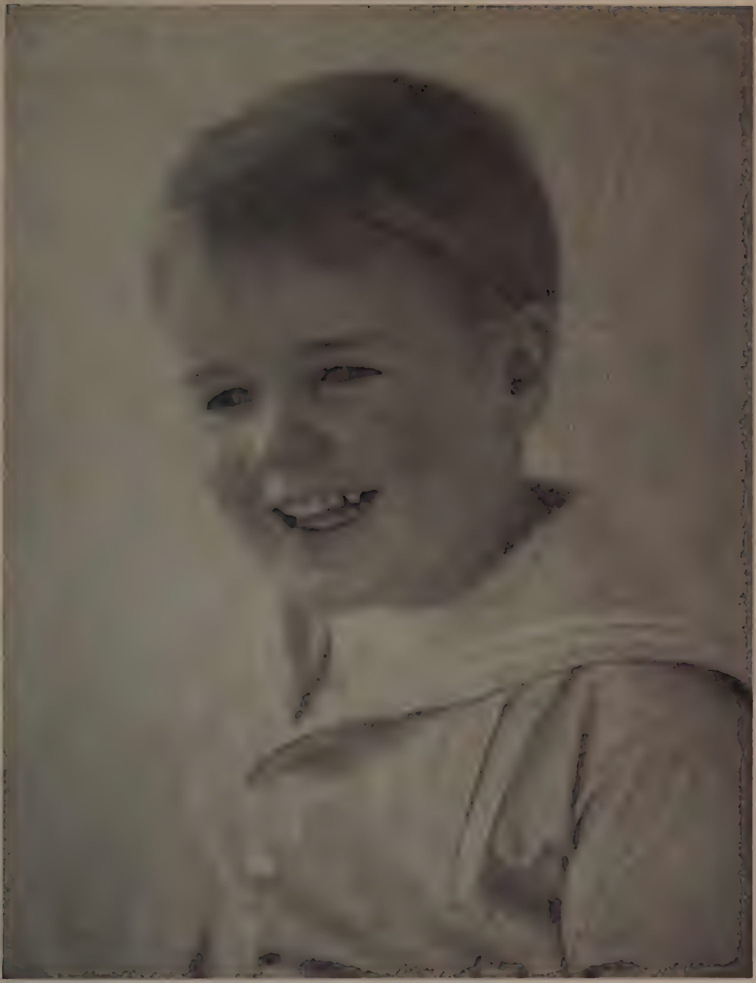


EVENING—BAR HARBOR. R. A. BARROWS.

and may be used almost without limit as to effect, even to producing a very strong print from an excessively thin plate. Five grains of the salt in sixteen ounces of developer will give marked increase of contrast, so the bichromate should be used with caution. Printing must be longer in proportion to the amount of bichromate used. It should be noted that although the developer keeps well after the addition of this salt, the effect of the bichromate wears off as it becomes exhausted, so that more must be added from time to time. However, the writer has developed two dozen 8 x 10 prints in twenty ounces of bichromated developer without any falling off in contrast, and without the addition of more of the salt. The potassium bichromate works equally well in a neutral developer, or in conjunction with bichloride of mercury.

A very beautiful color is secured by some workers, who use a slight amount of the mercury salt and omit the acid bath, merely rinsing the developed print in water, thus obtaining a warmth of half-tone and shadow in combination with an exquisite golden color in the lights. The platinum salt used for sensitizing is not sensitive to light—or only slightly so—and it must be combined with ferric oxalate to secure a practical printing paper. The object of the clearing bath is to remove the ferric oxalate which has not been acted upon by light, and the golden color referred to is the result of leaving this iron salt in the finished print. Obviously, such prints will in time show degradation of the lights, and the writer prefers to clear his prints thoroughly, and tone the lights, by brushing on Johnson's or Old English floor wax, melting the wax in over a stove or gas-jet. The color thus obtained is not quite so charming as that resulting from the other method, but it is very good and possesses the merit of stability. Further, waxing as described tends to lighten up any dull or sunken shadows, without giving the print a lustre. Burroughs Wellcome Soloid stains may also be used to give color to the lights, and work very satisfactorily.

Increased contrast and increased richness may be secured by adding a printing of gum to the finished platinum, and this is much easier than straight gum printing. The finished and dried platinum print is sized with a paste of boiled laun-



LAURA GILPIN.

dry starch which is rubbed on with a damp sponge, care being taken to cover the print thoroughly and evenly with the size, and after the size has dried a gum-pigment mixture is applied and blended in the usual manner. This mixture should, however, be a trifle thinner and decidedly weaker in pigment than for straight gum printing. When the gum coating is dry the print is placed on the negative in a printing-frame and the image is registered, which may easily be done by holding the frame up to a strong light—the negative toward the eye and shifting the print about with the fingers. It will probably be impossible to secure exact registration, on account of shrinkage of the paper through development and fixing, but in the case of a portrait the face should be registered and the rest of the image allowed to be slightly out; the difference will not be conspicuous. Printing time will have to be determined by experience, but if a saturated solution of potassium bichromate is used to sensitize the gum solution, the time of exposure will not be far from the time required for the original platinum. Development should, in general, be automatic, by simply floating the print, face down, on a tray of cold water until the soluble gum has all washed away, but this is by no means imperative; the worker must use his own judgment in each case. Generally speaking, too, the pigment used should be a trifle cooler in color than the platinum image, as this will produce a gradation of color corresponding to the gradation of light in the finished print, the effect so obtained being very pleasing.

Among the formulæ in the back of the *Annual* (page 280) will be found instructions for making hand-sensitized platinum paper, and this process, though much more expensive than using the commercial product, gives very beautiful results, since the color and surface of the stock may be suited to the subject, whereas the commercial paper comes in only one texture, and that not a very interesting one. Practically any of the good drawing or charcoal papers may be used for sensitizing, as well as the various hand-made paper, vellums, and tissues. The principal points to be noted in hand-sensitizing (the process is very easy) are that the sensitizer should be brushed back and forth until the paper is surface-dry, and that complete drying, which should take place by artificial heat, should in general consume not less than five nor more

C. M. Sanchez, Jr.

than ten minutes. Printing and development are the same as with the commercial paper except that the printed image is slightly less visible before development. Printings of gum may be superposed on a hand-sensitized print, or multiple printing in platinum may be used, the dried print being re-sensitized as at first, and printed and developed in the same manner. Obviously, variations of contrast and of color may be secured in successive printings.

In conclusion, the writer would emphasize what he has already said; that though oil and bromoil are in his estimation by far the finest photographic printing medium when quality is desired, he feels nevertheless that as a general purpose paper for the finer grades of portraiture, a paper for the comparatively easy and rapid production of quality prints, platinum has many merits and few defects, so that he would place it at the head of the list when more than one print is to be made from a given negative, or when commercial considerations make it impossible to use the more artistic but far more difficult mediums.

CHAS. H. PARTINGTON.

PINHOLE PHOTOGRAPHY SIMPLIFIED

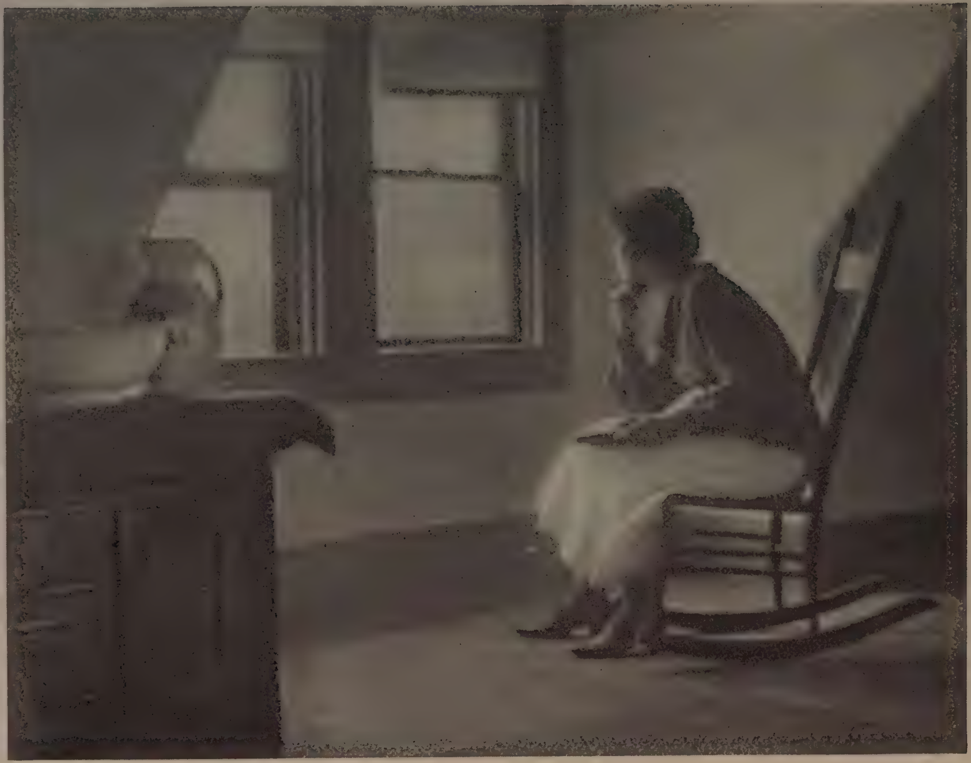
By **WILLIAM B. KEMP**

THE pictorial possibilities of pinhole photography have been covered by numerous writers, but unfortunately the directions for making and using pinholes have usually been so elaborate that few readers ever attempt to follow them. This article it is hoped will make the exposure as sure and simple as when using a lens, and will describe how to make a first class pinhole lens in ten minutes.

Many writers have claimed that the image becomes sharper as the pinhole is made smaller. This is not true as was shown by an experiment. Working with the point of a fine needle under a microscope a smooth regular pinhole about 1/350 inch in diameter was made. The camera was firmly clamped to the window sill and an exposure made for the required number of minutes. Development showed that plenty of silver had been affected, but the image was so extremely fuzzy that trees and buildings were scarcely distinguishable. Upon trying various other sizes of pinholes with several bellows extensions it soon became apparent that the sharpest image was obtained with a rather large pinhole. As a matter of fact, with an eight inch bellows extension the pinhole should be about one fortieth of an inch, which is about the size of an ordinary pin.

It did not take long to discover with the price of plates increasing that it would require a considerable expenditure to obtain conclusions experimentally. The photographic literature available at the library did not clear up the mystery, so text books on physics were dug up and the fundamental principles attacked. A review of the sections on diffraction and light interference soon began to clear up the matter. The common conception of light as travelling in rays had been the chief difficulty. The wave front propagation of light explains the behavior of pinhole lenses.

Some of the light which enters a pinhole is spread all over the plate by dispersion, a part is killed by interference, and



THE GIRL IN THE ATTIC.
(*Bromoil*)

RAYMOND E. HANSON.

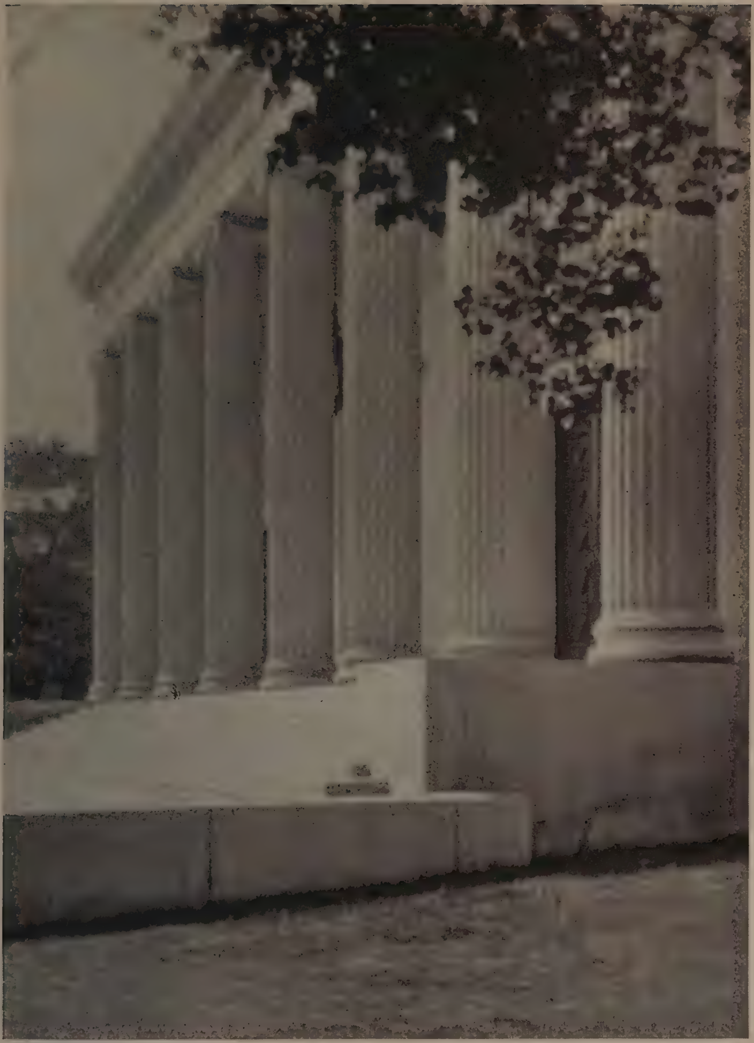
the remainder is effective in the formation of an image. If the pinhole is too small the dispersed light which is caused by light bending at the edge of the pinhole may become too great a factor in affecting the light sensitive emulsion. The photographer who uses such a pinhole gets a more or less fogged plate, depending on the size of the pinhole and the bellows extension. This result usually discourages dabblers in pinhole work who follow the common advice to make the aperture very small.

With a pinhole of the proper size light from each point on the object is caused by light interference to affect a spot on the plate smaller than the pinhole through which the light is being admitted. These spots of light are very much brighter at the center, so that under favorable conditions the definition may be surprisingly sharp.

In case the pinhole is made too large the points of greatest brightness of image for points on the object become circles of even illumination surrounded by zones in which the illumination falls off as it does from the center in a pinhole of the proper size. It is evident that the light circles for different points on the object will overlap more or less and result in a blurred image exactly like that obtained with a lens out of focus.

These theoretical considerations are based upon the assumption that only one color of light is present. In practice the sharpness of detail rarely approaches what would be possible under such conditions since usually several colors are present, and the pinhole best suited to one will not be so well adapted for others. It is possible, therefore, to make considerable use of filters in pinhole photography not only for color correction, but to limit the effective light to a narrow band of wave lengths. An unscreened pinhole lets in a lot of ultra violet light which would have been entirely absorbed by the glass of a lens. Plates and films are sensitive usually over quite a range of such invisible light. The glass of a filter will absorb most of this ultra-violet light, and the dyes in the filter will stop the remainder.

For the benefit of those who would wish to make allowances for color control in using pinholes with filters and orthochromatic or panchromatic emulsions Figure 1 has been made up to show broken line curves for red, green and two



NEW TEMPLE BETH-EL—DETROIT. WILLIAM B. KEMP.

lines in the ultra-violet, besides the heavy line showing the variation in the size of pinhole with the bellows extension for a wave length of four hundred and fifty millionths of a millimeter. This corresponds to about eighteen millionths of an inch, and is the wave length of that color of light to which the ordinary color blind plate is most sensitive. The scientific skill and accuracy of experimental work by Mr. Alfred Watkins is borne out by the fact that his data fall very close to this curve. (See Watkins Manual.)

If the plates used are insensitive to or protected from the shorter ultra-violet rays by a glass filter it is evident from Figure 1 that the size best adapted for the waves of eighteen millionths of an inch is not very different from that best suited to the shortest wave which can pass through glass, and the longest wave to which the emulsion is sensitive. Unless a panchromatic emulsion is being used there is not a very great difference. This accounts for the fact that pinhole lenses do so well. It is also evident that the limits of an ordinary camera bellows will not greatly affect the required size of pinhole. A six inch bellows requires about .0204″, an 8″ bellows .0237, and a 10″ bellows .0263″. If this rep-

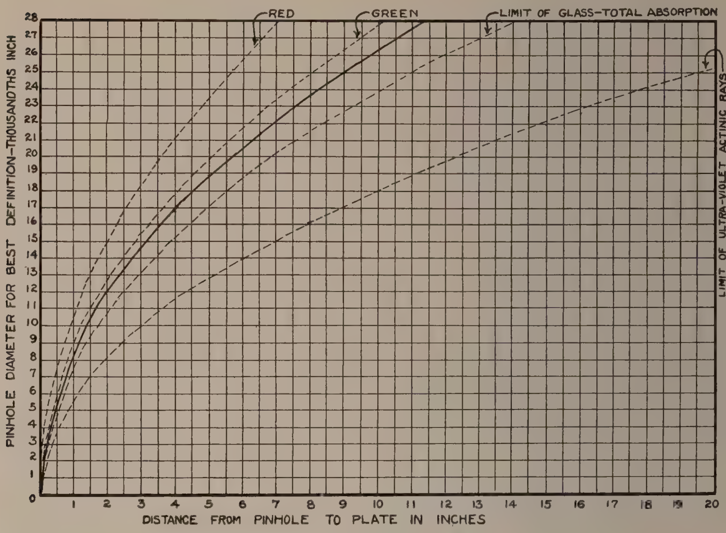
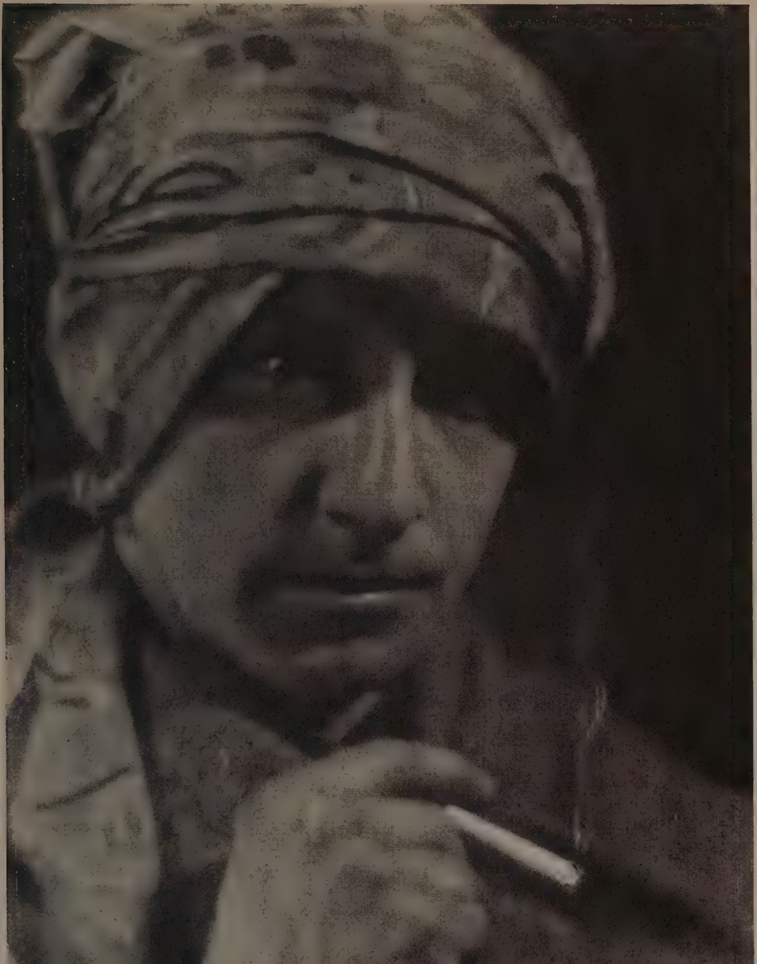


Fig 1



JOHN A. JESKE.

resents the limits of the bellows, and the pinhole is made for the 8″ bellows, it will be sixteen per cent too big for the 6″ bellows, and ten per cent too small for the 10″ bellows. Looking at it from another point of view the .0237″ pinhole will be at its best for orange light at a six inch extension, and for violet at a ten inch extension, so that we always have some color in fairly sharp focus. This is an effect very much like that used in a soft focus lens.

It is usually best to choose the size of pinhole for the shortest wave length light, as the diffusion on too small pinholes is preferable to that on too large.

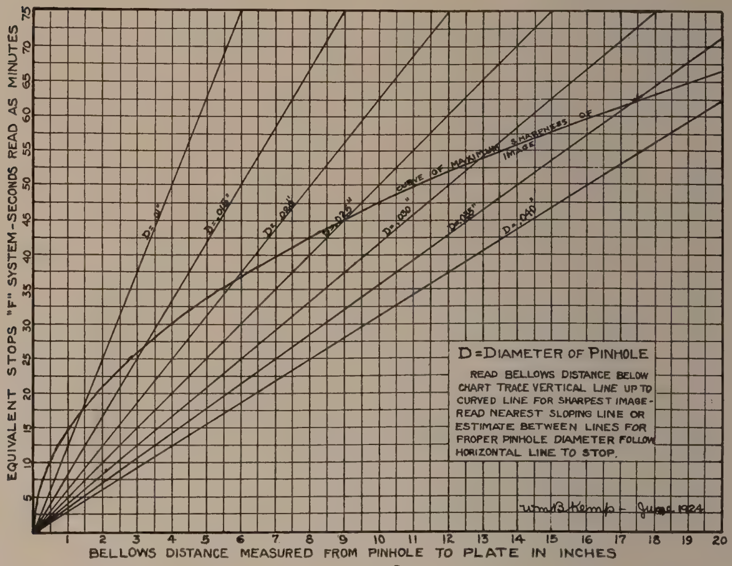


Fig 2

A larger pinhole may be used with a panchromatic plate if we allow a certain range of colors on each side of the chosen size. This helps to offset the slowness of the emulsion as compared with superspeed plates and films.

We must, therefore, conclude that where the range in variation of bellows is not too great a single pinhole may be used at all times, particularly if allowances are made for the proper emulsion and filter to fit the color requirements.

It is entirely practical to make enlarged negatives by sub-

LUCILE RICE IN "YOGI." Dorothy Jarvis.

stituting a pinhole lens for the regular lens in the enlarger, and using cut film or plates instead of enlarging paper. Such negatives made from sharp transparencies have surprisingly good quality. This is one of the most satisfactory ways of making a new negative from an original taken with the camera tilted so as to show convergence of parallel lines in architecture. Most amateurs have some such negatives which cannot be tilted enough in enlarging to print from the original negative without uneven detail.

Some novel effects with still life are possible since there is no danger of those flares caused by reflections on glass surfaces. Exposures are not so tediously long as might be expected. On polished objects where it is desired to have reflections show the small size of the pinhole aperture makes them clear-cut and clean.

If more diffusion is desired it can be had by making the pinhole larger or smaller. It should be made smaller if possible though there are times when speed will be worth more than quality, as for instance when the normal size would require an hour or two exposure.

Pinhole exposures may be determined readily with the regular exposure meter or calculator. Anyone who can determine lens exposures accurately can also be sure of those with pinholes. Several writers have proposed a scheme for using an equivalent stop number so chosen that wherever the calculator shows seconds the pinhole will require minutes. The chart (Figure 2) is designed to eliminate all mental gymnastics in making the determination of the equivalent stop to be used. Besides showing the relationship between bellows extension, pinhole diameter and stop a curve has also been traced across the chart which indicates where on the chart the maximum sharpness of image may be obtained.

For example: if it is desired to make an exposure at a nine inch bellows extension with the least possible diffusion the chart is used as follows: Locate 9″ on the horizontal scale and trace the vertical line upward to the curve. It is found to cross at .025″ sloping line. Tracing the line to the left parallel with the horizontal axis the equivalent stop is found to be F/45 which is usually the smallest stop marked on cameras. This chart is, therefore, a complete guide to pinhole photography for those who are familiar with picture making by means of lenses. The information may be reduced to the form of a table if desired by those who are not accustomed to use charts.

It is a very simple matter to make a first class pinhole for use on a reflecting or view camera equipped with a removable lens-board. A board the size of the lens board may be cut from an old cigar box. It may have to be shaved a little at the edges, or built up on the ends, to make it fit snugly so that no light will leak around it. Through the center of the board bore a hole one half to three quarters of an inch in diameter. A piece of black paper like that used in film packs, very thin and free from defects, should be carefully selected and glued to the side of the board which will be nearest to the film or plate. (Much of the black paper used in packing paper and plates will show innumerable very small holes when held up to a strong light. Such paper is, of course, unsuitable.)

Before making the pinhole the paper should be slightly moistened by a heavy glue or gum solution. When this has had time to soak into the fiber of the paper, and is beginning to become surface dry, a needle of the desired diameter should be carefully thrust through from what will be the front with the back surface resting on a pad of paper. The black paper, being slightly moist may be compressed around the needle so as to eliminate the burr which would otherwise be left. The needle should be carefully removed and the result viewed under a pocket magnifier. If the hole is not perfectly smooth it should be made so before the glue is allowed to dry. Once having the lens-board a new pinhole may be put upon it in a few minutes, whether at home, or in the field if glue, paper and needle are available.

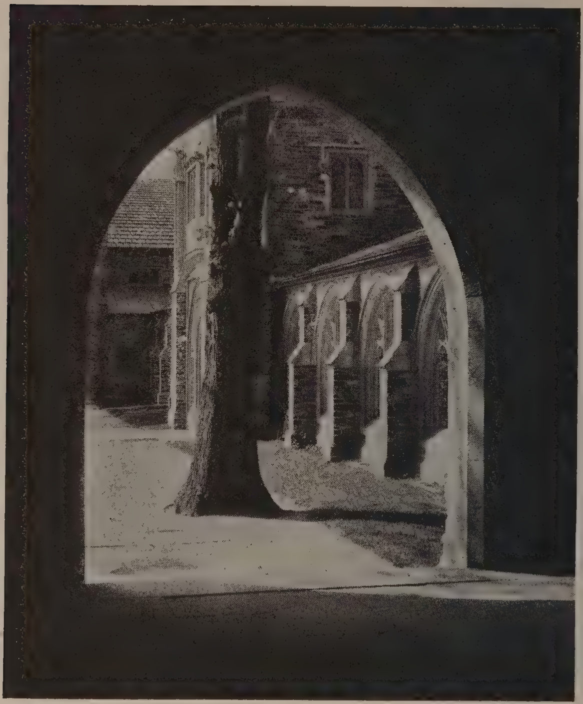
If it is desired to use filters, as is strongly to be recommended, a ring of metal the same diameter as the lens barrel on the regular camera should be provided.

Since pinhole exposures are ordinarily fifteen seconds or more the dark slide of the plate holder serves as the shutter. It is wise on all of the exposures under a half minute to hold a finger or lens cap over the hole in the pinhole board while withdrawing or re-inserting the dark slide. This will avoid blurring the image if the dark slide sticks a trifle, or there is any other delay in completing the operation.

S.L

STILL LIFE. C. N. SANCHEZ, JR.

These notes should lead many camera enthusiasts to try out this fascinating field who have hitherto been discouraged by the apparent skill and time involved in making a pinhole lens in brass or copper foil. The paper is, of course, not so durable, but it does the work at least as well. The paper is dead black unless too much glue is used, whereas metal surfaces are hard to blacken without special facilities. Whether paper or metal is used depends largely upon the whim of the user.



PRINCETON CAMPUS. DR. J. B. PARDOE.

TO PASTURES BEYOND. ALBERT WILLIAMS, JR.

HOME PORTRAITURE BY ELECTRIC LIGHT

By CHARLES L. SNYDER

THE amateur who happens to be a busy man during the daylight hours often finds it difficult to maintain his interest in photography for lack of opportunity to use his camera. Especially is this the case in the very interesting branch of home portraiture. If he waits for Sunday the persons whom he may wish to use as subjects for his artistic efforts have their own various plans for the day, and rarely are willing to surrender the golden hours of other arrangements to the photographic enthusiast.

How then may the hunger of the camerist in portraiture be satisfied and his interest maintained? The answer is, by taking the pictures at night. There are seven nights in every week, and each one usually has hours of relaxation and ease for the members of one's family and their friends. The evenings are full of photographic opportunities for portraiture in the home if the work can be done with artificial light. The facilities of electric lighting are now found in the great majority of the homes of those interested in home portraiture. This form of lighting is easily adapted to the use of the amateur at comparatively small cost.

For successful work a nitrogen filled bulb or lamp of 250 watts is about the minimum size. If this light is properly placed in a good reflector its efficiency will be greatly increased. With such a light placed not more than five or six feet from the sitter, and a lens working at F/6.3, good negatives may be made on rapid plates or film in from three to six seconds.

The efficiency of this arrangement is materially improved by the use of a secondary light of 75 or 100 watts placed on the

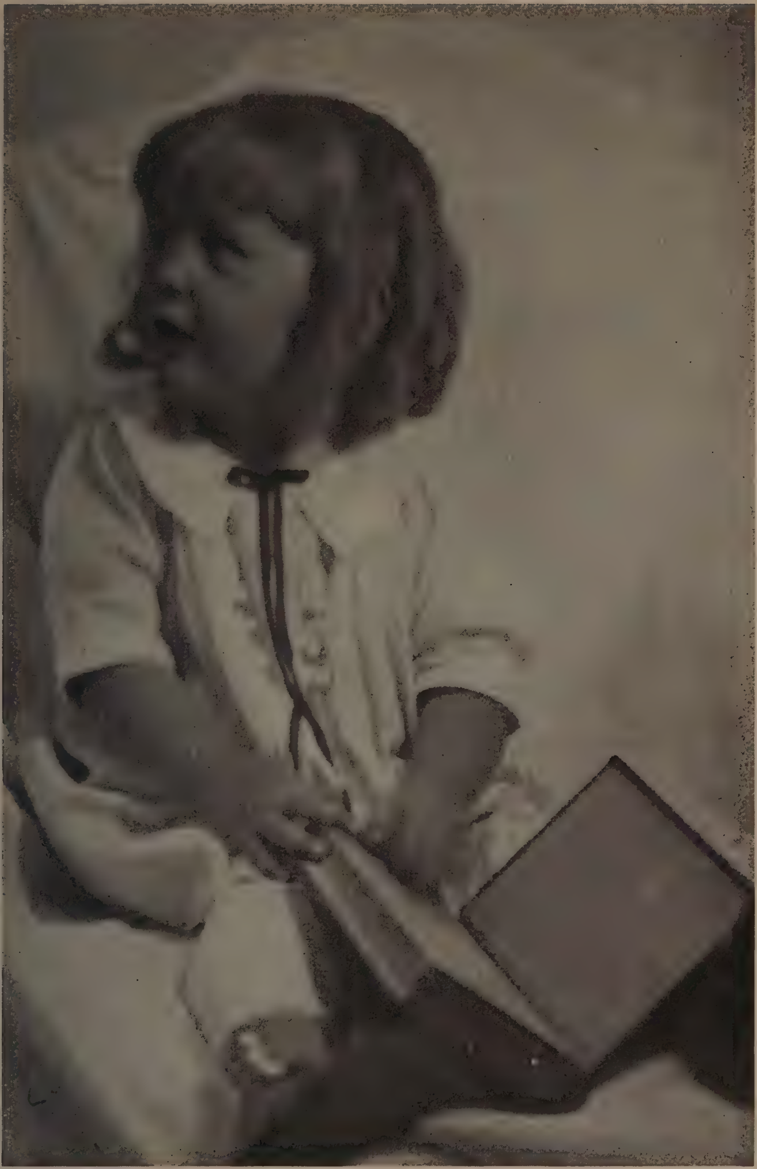


Figure 1

Illustrating article "Home Portraiture By Electric Light," by Charles L. Snyder.

shadow side of the sitter instead of a reflector. All lights for this work should be arranged on portable stands or supports which will permit them to be moved about and raised or lowered as required for the best lighting effects.

With this simple equipment of one or two lamps very satisfactory work may be done with adults or older children who can hold a pose for several seconds. For younger children, however, a more efficient arrangement is necessary. If the principal light is increased to 750 or 800 watts with a good reflector, and secondary or auxiliary lights to extent of 250 to 400 watts are added, it will be possible to shorten the time to ½ second or even less and secure fair negatives on fast plates with rapid lenses. To shorten the time to the utmost the sitter should wear light or white clothing, and the backgrounds and draperies on the seats provided should be white, or very light. To lessen the vivid glare of the larger light oiled tissue paper may be hung in front of it with pleasing results.

With artificial lights of the character described the widest range of choice in the lighting is afforded, and almost any type of lighting effect may be produced by a proper adjustment of the several lights.

With equipment of this kind, which may be obtained at small cost, almost any room of the home may be turned into a portrait studio, and the occupation of making home portraits be carried on in a leisurely and delightful way.

To illustrate the actual results that may be achieved with the types of equipment described attention is invited to Figures 1 and 2 accompanying this article.

Figure 1 was taken by indirect lighting with a 250 watt light in a reflector placed above and to left of the sitter, and a 100 watt light to the right with a Pinkham and Smith soft focus lens working at F/8. Made on one half of a 5 x 7 XX Central Plate.

Figure 2 was taken with two 400-watt tubular bulbs in front of a reflector as the principal light, and with three smaller bulbs aggregating 400 watts as secondary lights. Time ½ second with a series II. Velostigmat lens at F 4/5 on XX Central Plate.

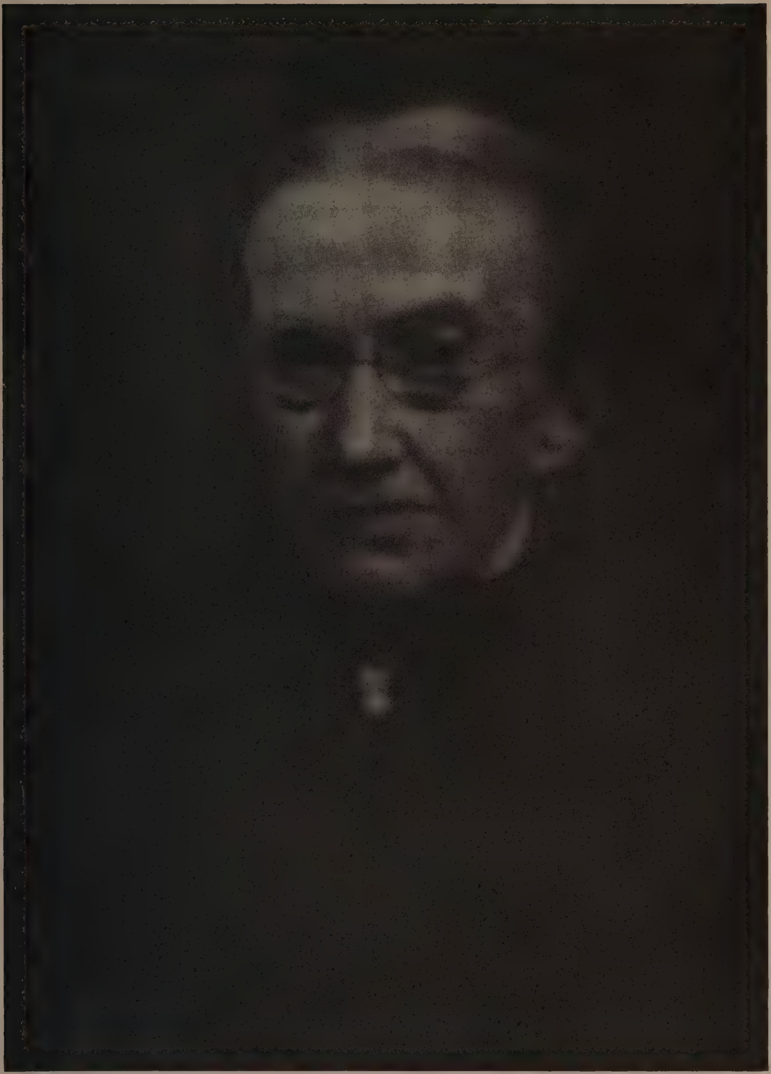


Figure 2.

Illustrating article "Home Portraiture By Electric Light," by Charles L. Snyder.

The plan described encourages many novel arrangements, allows the utmost latitude in lighting effects and permits the use of time and opportunity that would otherwise be lost to the enthusiastic amateur, and makes home portraiture a delightful pastime.

CLOSE OF DAY. G. H. SEELIG.

AT SEA.

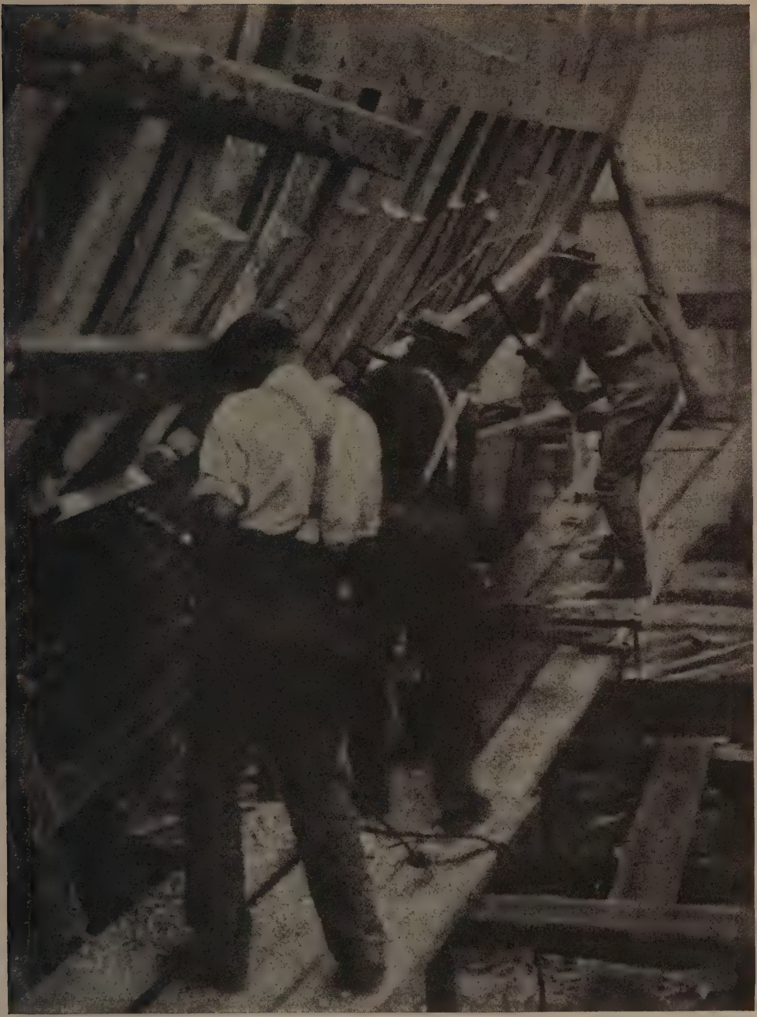
I. OZAKI.

WHY READ THE PHOTOGRAPHIC MAGAZINES?

By A. H. BEARDSLEY

THERE are at the present time upwards of fifty-six photographic magazines and annuals printed in the United States, Europe, South America, India, Australia and other parts of the world. Of these, according to available data, twenty-two are published in the English language. I wonder how many of my readers can name ten of them? In fact, it appears to be a task for the average amateur photographer to name five photographic magazines and annuals, even by giving him the entire photographic world from which to select publications. Many amateur and professional photographers simply do not know of the existence of any photographic magazines, other than those published in the United States; and, then, they are often unable to mention three of them by name. What is the reason? How may this situation be remedied? Is it the fault of the photographic fraternity or of the photographic magazines? Let us look into the matter. Perhaps, it may help to stimulate the reader to avail himself of the wealth of photographic information which he is letting slip by, simply through lack of knowledge.

In my opinion it is the seeming small interest shown in the deeper, finer things of photographic art and science that is directly responsible for the comparatively small number of subscribers to photographic publications. Is it too much to assume that there are one million camera-users in the entire United States and possessions? If it is true that the combined circulation of all photographic magazines in the United States does not exceed 40,000 copies per month, what are 960,000 camera-users doing to obtain photographic information and encouragement to make the most of photography? Apparently nothing. So long as they get recognizable prints they appear to have no interest in photographic art or technique. These are the vacation snapshooters who pack away their cameras just as soon as the holiday-season is over.



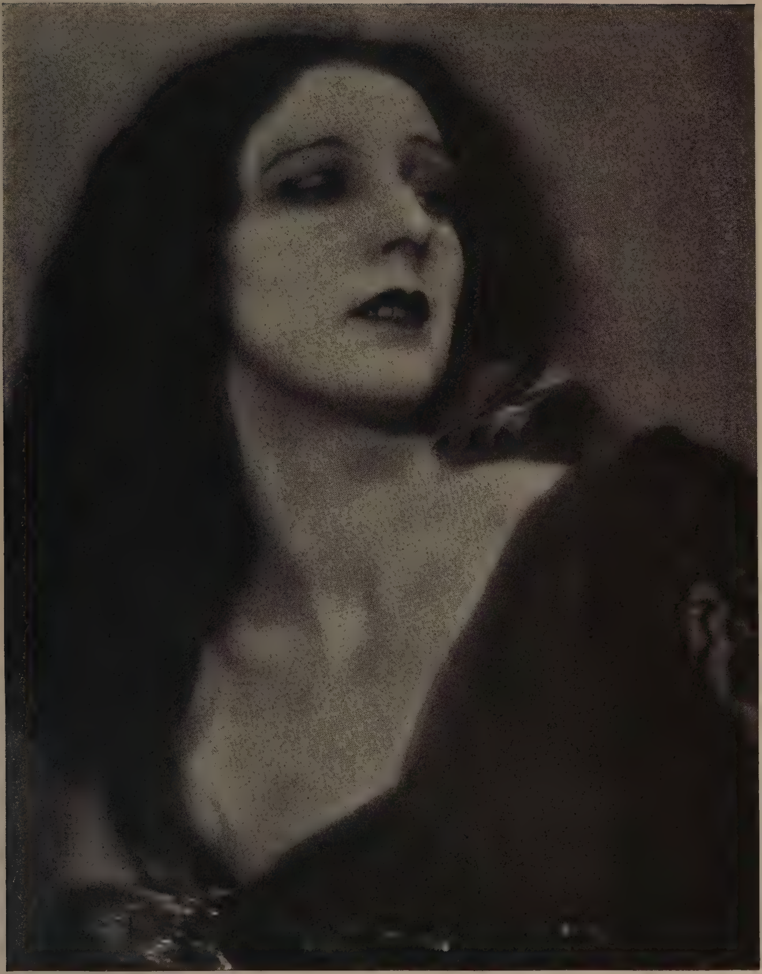
THE SHIPBUILDERS. EUGENE P. HENRY.
(Bromoil)

They do no photo-finishing themselves, and have no desire to do so. Hence, a large percentage of the 960,000 camera-users is composed of just such persons. Some become really interested in photography; but most of them are satisfied with things as they are.

However, among the amateur photographers—and I use the word amateur in its true meaning—there is a deep interest and a sincere desire to succeed. Then, too, we have the professional and industrial photographers and the progressive photo-finishers who are ever on the alert for ideas and better methods to carry on business. These, are subscribers and regular readers of photographic magazines and annuals. Really, those who should do the most reading are the ones to do the least. Yes, if ten per cent of the snapshooters in the United States would subscribe for and read one good photographic magazine a month, what a splendid day would dawn for photographic progress, profit and pleasure.

It seems to me that the systematic, friendly, helpful education of the snapshooter or beginner in photography is the one may be to increase readers of photographic magazines and annuals. Most experienced photographers are aware of the value of the photographic press, but the snapshooter must be shown in a kindly way that he is simply treading water until he puts his best effort into the use of his camera. Once his enthusiasm and interest is aroused he will seek out the photographic magazines and annuals which he finds help him to make consistent progress. In hunting, motoring, yachting and other sports, those who really are the most proficient are careful readers of one or more magazines devoted to their special branch of sport. These men and women do not seem to consider it a burden to keep informed; and why should amateur and professional photographers be any the less interested or less given to reading magazines devoted to their hobby or profession?

Now with regard to the photographic magazines and annuals, are they failing to gain the attention of the photographic fraternity because of lack of appeal? No publisher would say for an instant that his magazine could not be improved. However, a careful investigation reveals that virtually every photographic magazine and annual addresses



STUDY. JOHN HOWARD PAINE.

itself to a certain school, class or purpose in photography. The pictorialist, the beginner, the professional, the amateur, the photo-finisher and the general student will find in some one or more magazines the information, help and stimulation which he needs to keep up his interest. No two publications are alike typographically or editorially. By no means can it be assumed that having seen one photographic magazine the reader has seen them all. Each has a certain appeal, and it is up to the intelligent camerist to select those which serve him best. Price should be a minor consideration. The point is to get in touch with the pulse of photography as it is reflected in the photographic press of the world.

Why, then, read the photographic magazines and annuals? Let me answer the question as I understand it in its relation to photographic progress and pleasure. Let us assume that I have survived the tyro-days and now possess a good outfit, and considerable photographic experience. I have made pictures of the entire family, the pets, the rooms of my home, the camp in the woods, the motor-boat, the auto and everything that interested me. I have arrived at the point where my camera does not arouse much enthusiasm and there appears to be no more photographic worlds to conquer. What to do? Get one or more photographic magazines and annuals. Read them all from cover to cover, advertisements and all. Well, what of it? Unless I am very much mistaken a number of new ideas, facts and suggestions will be the result. Composition will begin to mean something. The decision to send a print to some competition or salon will not seem so absurd as it did formerly. The advisability of joining a good camera club is apparent and even an attempt at a bromoil has an unexpected appeal. Then, too, the news of what is going on in the photographic world is not so dry as it was first thought to be. Moreover, a number of illustrated articles hit the nail on the head and parallel experiences of our own. In fact, I begin to be eager to talk things over with other photographers. Without being really conscious of it, a new and tremendous field of view opens up and I realize that I have not even scratched the surface of the great possibilities for profit and pleasure in photography. The very advertisements become as interesting as the text-matter. Before I know it, I am talking about the latest lenses, shut-

LAGO MAGGIORE. Louis J. Steele.

ters, tripods, developing-tanks or processes. My friends consider me an expert and remark upon how well informed I am. A few minutes, now and then, with the photographic magazines is sufficient; and, after all, it is really a pleasure to get into the subject and know something about the splendid art and science that photography has grown to be.

If the photographic press is supported, where support is merited, the camera-users throughout the world will find that photographic magazines and annuals are and will become the milestones of photographic progress. The more subscribers and the greater advertising patronage a photographic magazine obtains, based on true merit, the larger and more influential does the publication become; and, most important of all, the more it can do for photography. Sometimes, it would seem that manufacturers and dealers believe it to be a favor to advertise in the photographic magazines. I am not so sure that the photographic press of the world is not in a position to say that it confers a favor on every advertiser by accepting his advertisement. How else could a reliable manufacturer or dealer reach the entire field and do so successfully without the prestige of a first-class photographic publication behind him?

Therefore, in conclusion, the snapshooter, beginner, amateur, professional and student should read photographic magazines and annuals for his own technical and artistic growth. Because by so doing he will find that he has opened a door into a wider and more beautiful field of activity in which his best effort is required. There will be beauty for him where none existed before and there will be a desire for a good workmanship and skill. But, best of all, there will come a time when composition, technique and the study of pictures will lead on to an understanding of the deeper, finer things of life. Photography will then no longer be associated primarily with the vacationist or the studio, but rather with the very lives of those men and women who have found in it a panacea for physical and mental ills. Let me risk a prophecy to the effect that neither radio nor any sport or pastime of the future will permanently replace photography. We may drop it for a time; but soon we are back, because in photography there is that which no other sport or hobby can give in like measure. Read the photographic magazines and annuals because they are trying to help and promote the growth of photography. By supporting them, the camerist aids his own progress; and, when all is said and done, each cannot very well do without the other. In photography to-day, we need high artistic standards, sincerity of purpose, clear vision and sound business ethics. We need inspiration, instruction, encouragement and kindly pictorial criticism. We need a spirit of comradeship, good will, fair play and patience with the efforts of the humble beginner. All these good things are being brought about gradually through the photographic magazines and annuals of the world.

WINTER REFLECTIONS. CHAS. H. PARTINGTON.

LENGTHENING SHADOWS. RAYMOND B. RYAN.

INTENSIFICATION OF THREE-COLOR CARBRO PRINTS

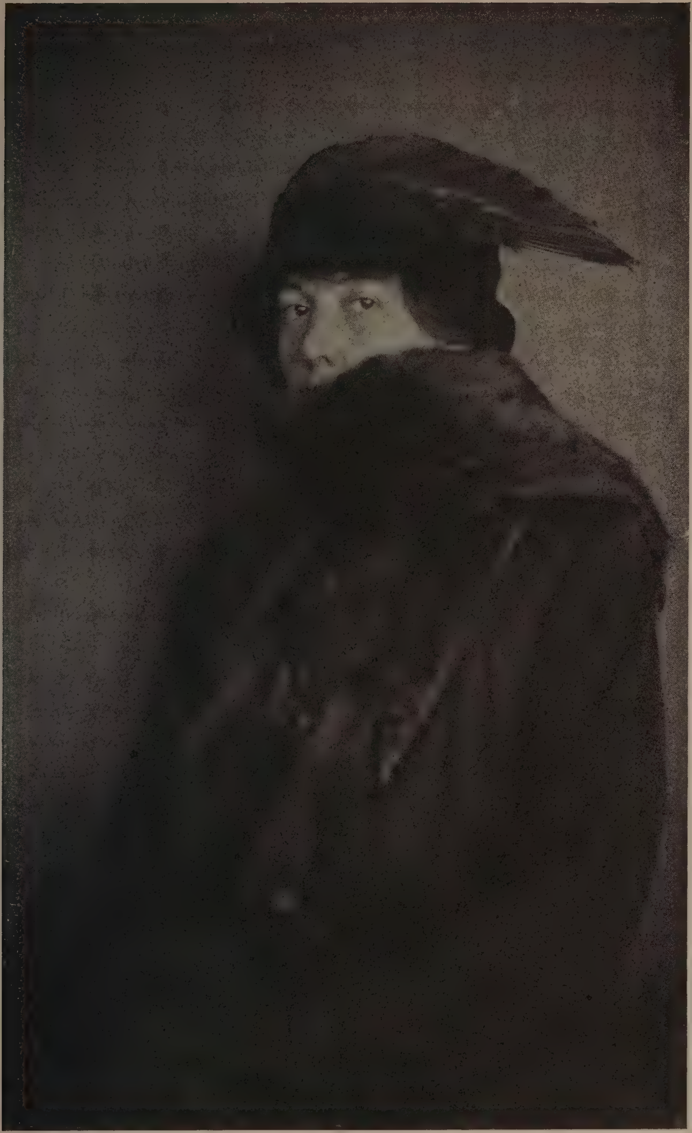
By FREDERIC G. TUTTON, F.R.P.S.

MANY workers in the Three-Color Carbro Process having voiced the complaint that the resultant color print is too mechanical in its production, and that control as to the effect desired is only obtained after an expenditure of time and waste material, the author has decided to put forward the following paper as supplementary to his thesis last year in the *Annual* on Three-Color Carbro.

It is assumed that this previous paper has been read, and that color workers are conversant with the technique of Three-Color Carbro. In the present paper I, therefore, propose to describe the method I use for controlling the final result. The addition of a dye to the color chromated-gelatine gives an added brilliancy to the image, increasing the colors to such an extent that what was rather flat and pale is rendered full and rich in coloring, besides increasing the contrasts. The final result can be controlled to such an extent that if after printing one or two of the colors has received more exposure than the third, this third color can be strengthened to preserve the balance of the original subject, and so produce a correctly colored positive.

The process can also be used for altering the tone of the colors, and getting any particular effect the worker desires. It would be possible for example, in a portrait, to keep the flesh tints in their correct tones, and to increase the shade of the background, drapery or costume to a very much heavier tone, thus making the flesh of the figure the dominant feature in the final result. Any particular effect can be obtained, such as an evening glow to a photograph which was taken in midday, by increasing the amount of yellow and red, or, obtain a sombre effect by increasing the amount of blue only. In fact, practically any effect that may appeal to the worker's imagination.

After developing the three tissues, viz: red, yellow and blue, upon their respective temporary supports, they should



LADY WITH FUR NECKLET. FREDERICK G. TUTTON, F.R.P.S.

be rinsed in cold water without any previous soaking in an alum solution. The reason for this is that the gelatine should remain in as soft a condition as possible, so that when placed in the dye bath, a more even dyeing of the film takes place. My first experiments were carried out with dyes recommended by Von Hubl in his book for staining gelatine reliefs, afterwards several dyes of a different kind were used such as aurantia, naphthol orange, golden yellow, fast red, tartrazine, carmine, methyl and methylene blue, but these gave results which made the final print somewhat heavy in appearance, or not of a good color. Blue especially being the most difficult to get a satisfactory result, I subsequently fell back to the original dyes used. Even now, after much experimental work, I feel that the blue dye does not give as correct a result as one could wish, as, if too much is taken up by the gelatine, the result is somewhat heavy, so much so, that I prefer, if possible to dispense with the blue dye altogether. The red dye seems to be the most perfect you can get, while yellow seems quite good.

The actual amount of the dye used is such a minute quantity that I prefer to keep it made up in the form of a solution, and a one per cent solution is found to be quite strong enough to give any degree of dyeing required. The dyes used are for the yellow, naphthol yellow, for the red, erythrosine, and fast greenish blue for the blue. The actual working baths are as follows:

Yellow.	Water	8 oz.
	Yellow stock solution...........	¼ to 2 oz.
	Glacial acetic acid..............	¼ oz.
Red.	Water	8 oz.
	Red stock solution..............	¼ to 2 oz.
Blue.	Water	8 oz.
	Blue stock solution.............	¼ to 2 oz.
	Glacial acetic acid..............	¼ oz.

Note carefully, no acid must be added to the *red bath* otherwise decomposition of the dye takes place. In making up these solutions it is, of course, a *sine quo non* that all measures be washed free from one dye before being used for another color, otherwise the carbon tissue will take the two colors with consequent degrading of the final tones.

The temporary supports carrying the developed tissue are

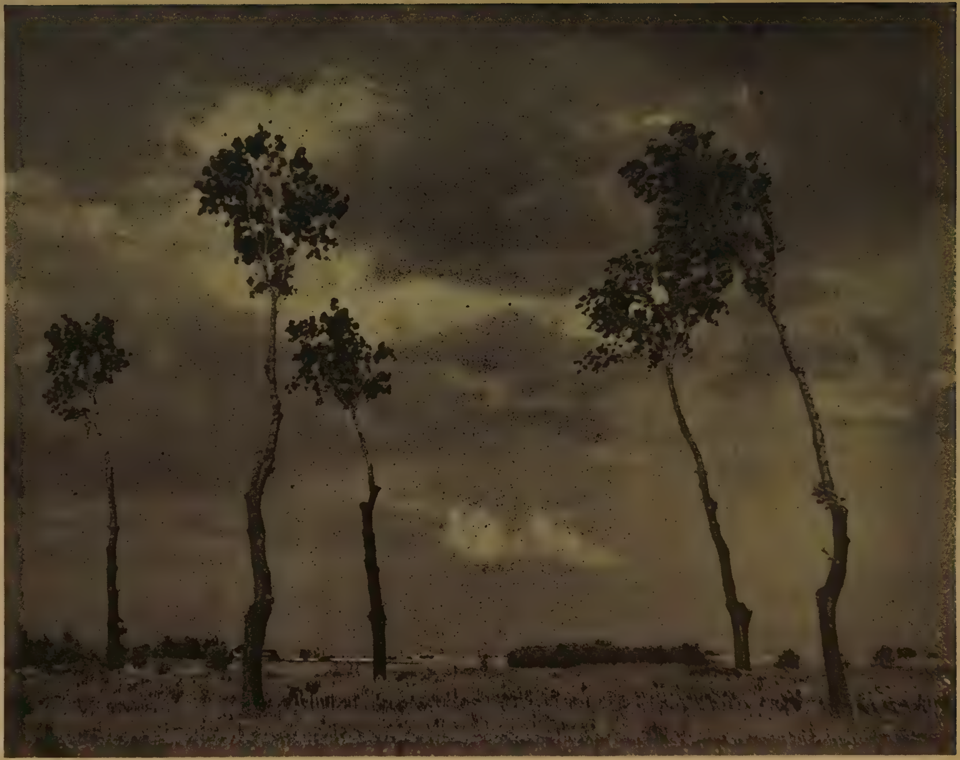
THE WIND MILL. F. C. BAKER.

immersed in their respective color baths, and left until the desired amount of increase in color is obtained. According to the degree of intensification required more or less of the concentrated stock solution is added to the acid solution. A small amount of dye gives more brilliant effects, while too much added to the acid solution gives a somewhat heavy effect, besides reducing its contrast and rendering control more difficult. Dyeing takes place in anything from fifteen minutes to five hours, and it is astonishing the amount of dye that can be taken up by the tissue. The red seems to take up only a limited amount, while blue and yellow seem practically unlimited in the amount they will absorb. It is really in the blue that one has to exercise the most care, this being the easiest color which can be overdone and so over-power the other two.

In practice I have found that the average amount of dye to the acid bath is about one-half ounce of the concentrated dye to eight ounces of acid solution. The tissue is immersed therein and examined every half-hour to see when it should be stopped. For this examination the plates are rinsed in water made acid with acetic acid, shaken to remove surplus water, laid one over the other, roughly super-imposing the images, and examined with a piece of white opal glass as a background. This will quickly reveal whether any of the colors require more dye, or, whether any require to be reduced. If more color is wanted, a further immersion in the dye bath will produce the desired effect. If the color requires to be reduced, rinse in plain water for the yellow and blue and water with a slight amount of ammonium hydrate added for the red.

It is not advisable for the tissue to remain in the dye bath for a longer period than five hours. A too lengthy immersion causes reticulation of the delicate gelatine film, especially where a heavy shadow comes next to a high light, and in one instance when the support was left in the bath for a period of, I believe, fourteen hours, practically the whole of the film came away from its support. Another drawback to prolonged immersion is that sometimes there is a tendency for the film to break up into a number of minute holes.

Having satisfactorily completed the right amount of intensification, the tissue is rinsed in water eight ounces, glacial



W. H. Porterfield.

acetic acid one-half ounce, until the high lights are free from color, which takes place in about ten seconds or so. The tissue is then hung up to dry before proceeding with the next operation which is to fix the dye.

Up to this point everything is straightforward and more or less under the control of the worker. When transferring the dyed tissue to its final support, and if the attempt is made without the dye being more or less fixed in the gelatine, the colors will run and produce a muddy picture. To fix the dye, the dried tissue is immersed in the following solution,

Chrom alum	1 oz.
Copper sulphate	95 grs.
Distilled water	10 oz.

and left for about ten to fifteen minutes. The bath must not be rocked, for during the first two or three minutes the dye still has a tendency to run. At the end of its immersion the tissue is removed, rinsed in distilled water and dried.

From this period onwards, plain water must not be used, although the dye is more or less fixed in the tissue water still has a tendency to wash out a slight amount of the dye, this being particularly the case with the blue. The tissue having been all this time on the temporary support, it is now necessary to transfer it to the final support, and a cement must be used. This consists of

Gelatine	1 oz.
Distilled water	10 oz.

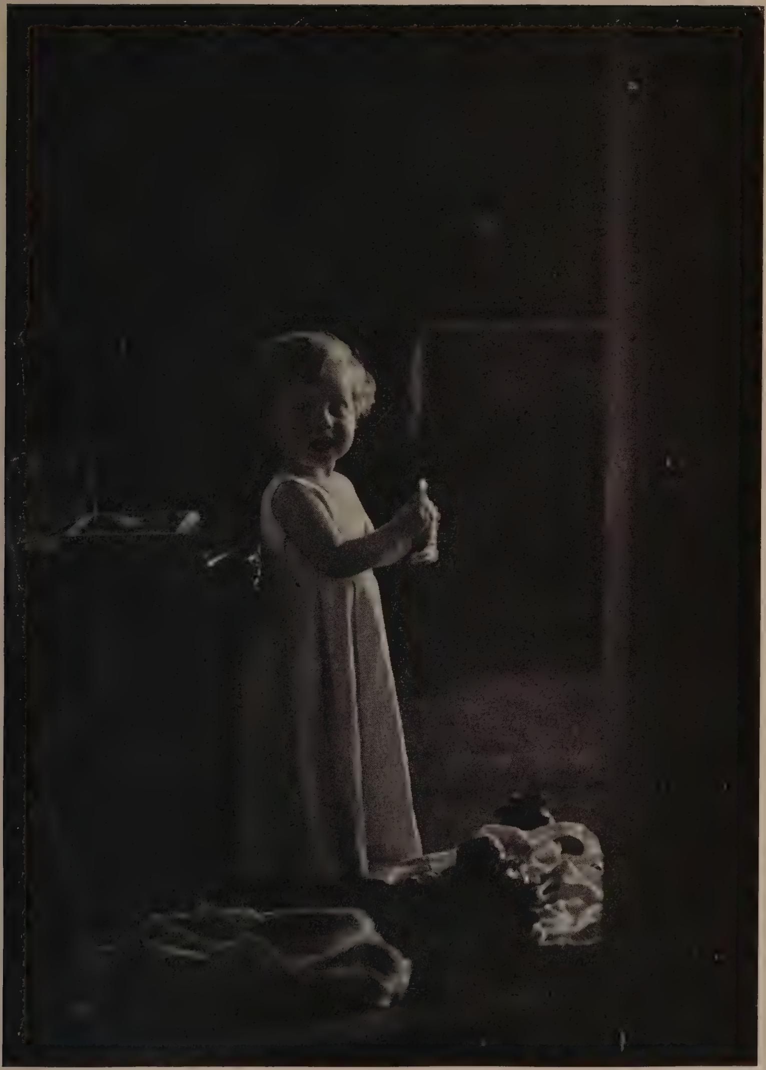
Dissolve by gentle heat, and when nearly cool an equal volume of either methylated spirit or alcohol is added, and the whole stirred together, with a few drops of carbolic acid added to preserve it. If methylated spirit is used this must be added a little at a time, otherwise the whole gelatine will decompose and not set. Methylated spirit also produces a milkiness in the cement, but this does not seem to have any deteriorating action upon its use. When this is cool it will be found to set into a soft jelly which can be kept either corked in a bottle or not. I have found this cement to keep for over three years. For the actual cementing, a sufficient quantity to cover the work in hand is placed in a beaker and melted by the aid of a water-bath, at a temperature of about 90 degrees F. When melted, two or three drops of a five per cent solution of either chrom alum or ammonium bichromate is added to give an additional hardening effect to the gelatine when dry.

A piece of the final support, The Autotype Company's Fine White Smooth is pinned flat to a drawing-board, and with a broad brush a little of this cement is brushed over. The support will first have a tendency to curl and then lie flat. When the pins holding the support to the board can be removed, another coating is then given. Next the yellow positive is taken, still on its temporary support, a little of the cement brushed over the tissue and immediately laid tissue side downwards on the final support, and the two brought into close contact with one another by well squeegeeing together. After drying the two supports will come apart quite easily, the final support bearing the yellow image.

The red positive has now to be super-imposed on the yellow, but before proceeding to transfer the red tissue, it is necessary that all traces of the wax that held the yellow tissue on the temporary support be removed from the yellow positive by rubbing the positive over with a swab of cotton wool saturated with either benzol or petrol and giving a final rub with a piece of clean wool and benzol.

The red positive is cemented on top of the yellow in the same way except that only one coat of cement need be given to the yellow positive. The red positive is also given a coat of cement and very carefully super-imposed over the yellow so that the outlines of the two images exactly coincide with each other, carefully squeegeed together and hung up to dry. When squeegeeing it will be noticed that the cement oozing round the edges is tinged with red. No notice need be taken of this, for if the two supports are well squeegeed such a fine film of cement is left between the two tissues that it is practically colorless.

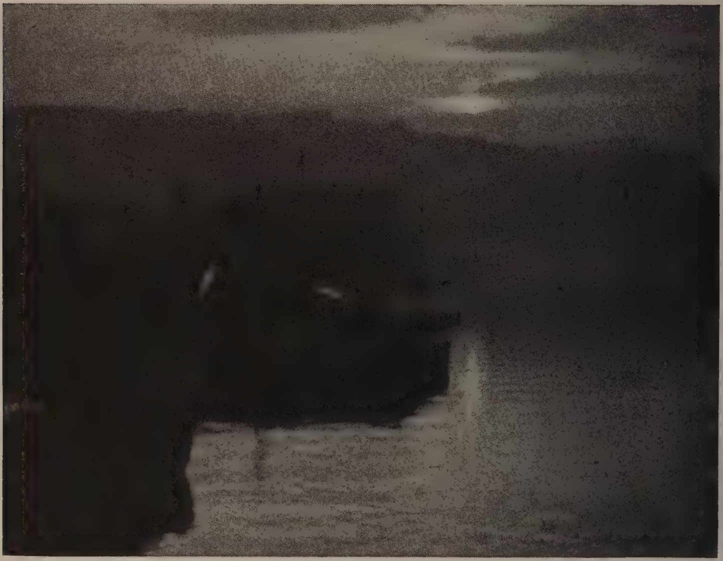
The two supports are pulled apart when dry, any wax still adhering to the tissue removed. The blue positive super-imposed on the yellow-red image and cemented in the same way. It is dried for the third time and pulled apart. The final support will now bear all three of the super-imposed colored tissues, the colors blending together to form a picture



RONAI DENES.

in natural colors. It should be noted that any cement left in the beaker after completing the work in hand should be washed away and the brush well cleaned with soap and warm water, as of course, if any cement dries on the brush and is afterwards exposed to light, the presence of the bichromate will so harden it that the greatest difficulty will be experienced in rendering the brush sufficiently soft and pliable enough to be used again.

To render the surface of the finished print "mat," the wax is removed as before and the print immersed in distilled water for about *fifteen seconds* at the *outside,* when it is hung up and dried. It is then flattened and cut to shape, and mounted as desired.



SUNSET ON THE ALLEGHANY. JOHN ALLEN.

A CLEAR STREAM. TOYO. OKAMOTO.

NATURE WORK WITH THE CAMERA

By ARTHUR H. FARROW

IN these days of specialization many amateur photographers are looking for a branch that will prove interesting and really worth the effort devoted to it. Nature work with the camera, to my way of thinking, is the most fascinating phase of photography that any person can take up. It offers an endless variety of subjects for the camera and its possibilities are unlimited. As in every other branch of photographic work, care and patience are necessary to obtain really effective pictures, but the results will amply repay for the trouble.

Birds and wild flowers, for instance, are such beautiful and picturesque objects that they readily lend themselves to making photographs that are real pictures, and not merely records.

The range of subjects is a wide one. If one has a leaning towards the Zoological side, one might undertake the portraying of the birds in their haunts—in particular the nesting habits and the progressive growth of the young; the butterflies and insects; the larger and small mammals—deer, rabbits, mice, and such like; snakes, frogs, toads and other reptiles. If one is more interested in the botanical side, there are the wild-flowers, trees, fungus, etc.

If one is a keen lover of nature and is gifted with an observing eye, one will find in every ramble through the woods, or along the countryside, scores of subjects waiting to be portrayed.

Nature photography will lure one out into the great outdoors in search of subjects, and no exercise is more beneficial to health than walking. Those who take their cameras and get close to nature's heart in the search for pictures of her fairest children will never regret it.

As one's interest in photography grows, there comes a greater appreciation of nature and a desire to know more of her wonders, and to delve deeper into her secret hiding places. There is no branch of photography that offers more that is

Illustrating article "Nature Work With The Camera," by Arthur H. Farrow.

attractive to the outdoor man or woman, or more that is interesting to the student of natural history.

The birds are favorite subjects and attract very much attention. It is not always necessary to go far afield in search of subjects. Many charming pictures can be obtained of the little feathered visitors who frequent our lawns and gardens in search of food. The writer lives in the suburbs of a large city, and has obtained many excellent studies of birds' nests within fifteen minutes' walk of his home.

The photographing of plants in their native haunts is a most fascinating pursuit. The results not only prove beautiful as pictures, but possess a scientific value.

Those who are located in the large cities will find opportunities for nature work with the camera in the public parks. Then, scattered throughout the country are a number of splendid zoos, and these are paradises for the animal-loving photographer. They offer exceptional opportunities for obtaining pictures of unusual interest. The secret of successful zoo photography lies in being prepared. The habits and characteristics of the various subjects must be studied, and great patience and careful observation must be devoted to securing an effective pose, suitable lighting and background. It often happens that you wish to photograph an animal that is behind wire-netting, and you are afraid the netting will spoil the picture. Hold your camera as close as possible to the netting and make the exposure. If the lens is close enough, the wire-netting will not show at all.

When one mentions nature photography the thoughts of the average worker turn to telephoto lenses, electrically-operated shutters, and a host of other costly apparatus. While some of these articles are desirable, they are not absolutely necessary. Nature photography is within the reach of even the owner of the humblest Brownie. A tripod is a necessity and unless the camera is equipped with ample bellows extension, a portrait attachment should be used or the image will often be too small to produce a satisfactory contact print. As one's interest increases, and I am confident it will, apparatus to suit the particular line of work you engage in can be added to your equipment. Personally, I use a 2¼ x 3¼ camera whenever possible, because of its many conveniences. For some work I find a 4 x 5 or 5 x 7 camera with extension

Toyo Okamoto.

bellows very useful. Many old-timers are still under the impression that plates must be used for any serious work. The motion pictures have demonstrated that films can be used advantageously for almost any purpose, and many workers are using them exclusively. In addition to roll films and film packs, cut films to fit standard size plate-holders may be obtained and can be recommended.

The greatest joy in photography to me apart from a day's outing with my camera, is to make lantern slides from my negatives and nature subjects are especially adapted for this purpose. They also offer exceptional opportunities for hand-coloring. Then, there is the commercial side of nature photography to be considered. There is a steady demand for interesting nature studies by magazines and newspapers that publish photo-gravure supplements. By selling occasional prints one can get the money to buy new apparatus. Illustrated articles are also in demand.

There is no hobby that gives one as much real pleasure as photography does—there is no branch of photography that affords as much real satisfaction as nature work with the camera. It has two outstanding features which deserve earnest consideration, it is health-giving, because it takes one out into the open-air in search of subjects; it is educative, because it opens one's eyes to the beauties and wonders of nature. So many people walk around with eyes shut to what is going on around them, and consequently miss much of the charm and mystery of nature.

A METHOD OF WORKING-IN SKIES

By EDWARD OSTROM, JR.

NO claim of novelty or originality can be made for the following suggestions; but they may appeal to the fancy of some beginner, or even an old hand. Briefly the method consists of working in the desired sky effects by means of an application of powdered graphite to a temporary print that is intermediate to the finished picture.

Many an honest negative leaves the hypo with every virtue complete except a fine sky. Beautiful cloud effects, of course, cannot cure a sick foreground; but a promising landscape can undoubtedly be ruined by a profligate sky. Nor is the reason far to seek. In nature herself, the surmounting splendor of any scene is precisely the variegated blue and white of heaven, further adorned by the brief gold of twilight, muffled at times in a swirling mantle of storm. The commonest act of artists, pilgrims and hobos is a fascinated scrutiny of passing clouds. In short, what would our world be like without a sky? The landscape photographer who fails to recognize the importance of heaven in his picture, fails in a most impressive principle of his art.

The ambitious worker, moreover, if using a plastic medium such as oil or gum, will waste ten prints to get a perfect one, and be unable to duplicate that; if using a printed-in sky, while he may have in stock a number of sky negatives, yet none of them will be quite adaptable; and he will find no suitable cloud to photograph when he sets out to make the one he needs. The worked-in sky, on the other hand, eliminates both difficulties. It yields a finished negative capable of producing innumerable prints, while the variety of its design is limited only to the imagination and skill of the operator.

Assuming that we have a negative—probably a small one—from which an 8 x 10 picture is desired, an intermediate, sharply focussed, black and white print, about 6½ x 8½, of good contrast must be made, on which the sky—or, in fact, other improvements, are to be worked in. A larger intermediate would require a greater expanse for working-in;

PHYLLIS. ROY H. HEISER.

while a smaller might expose its blemishes in the final enlargement.

The sky of the original negative may afford a suitable basis of suggestion to work on; in that case it need not be blocked out or dodged in printing; or it may require to be altogether blocked out, by a wash of black paper, or opaque, on the glass side of the negative, thus leaving a white sky to be entirely worked in according to the operator's own fancy.

In the intermediate print, a glossy surface should be avoided, as it cannot be artistically worked. Rough papers are even worse; a smooth, dull finish like an eggshell gives the least trouble and most pleasant effects. The ordinary M. Q. tubes afford a convenient and suitable developer. After development, the intermediate print should be carefully fixed and washed, and mounted on a stout white card, when it will be ready for manipulation.

The sky or other adornments may now be added in the following manner: Lay the mounted print flat, or at a convenient angle, in a good light. Dip a small tuft or dry cotton into dry powdered graphite—purchasable for a few cents at most paint stores—and dust it lightly across that part of the print to be doctored. Slowly increase the pressure, adding other modicums of graphite as needed. An even, gray film will begin to appear, darkening as the rubbing proceeds, until the desired density is reached. The range of tones is quite satisfying, extending from an imperceptible pearl to an almost jet black. This film of graphite is itself the medium—comparable to gum or oil—in which the operator will now attempt to shape his fancies. It is soft and easily rubbed out. Hence, variations of this flat tone are readily obtainable.

To put in a cloud, rub it out—that is, remove a patch of graphite with a soft rubber; blend the edges with a finger or stub; darken the nether surface of the mass; and the result will be a cloud. With equal facility, a brilliant sunset band may be produced above a darkening horizon. The whole sky may be graded slightly from top to bottom, so as to suggest the pure blue of the zenith, blending away into a luminous haze. Natural looking shadows may be worked in upon a foreground, where there were none in nature; tree trunks may be rounded; masonry improved; interior shadows fashioned cleverly, and troublesome high lights pleasantly toned

STREET CORNER IN HAVANA.

FRANKLIN GRAY MC INTOSH.

down. In a word, the possibilities are beyond number.

But if the finished game is faulty to the umpire, no permanent harm was done. The rubber removes the score; fresh graphite starts a new card on the undamaged slate.

The manipulation completed, an enlarged negative of the desired size should now be made from the print by means of a gently handled diffusing lens, which will eradicate the artist's "footprint" and supply enough "atmosphere." Eastman's commercial films are very satisfactory for this purpose; and possess the added advantage over glass plates that they may be reversed in printing, thereby eliminating "double transfer" if the final print is carbon. Any contact paper, of course, may compete for the final honor. The completed print, however, will have less of contrast and detail than the intermediate print from which it was made.

The cynical critic now beholding the finished composition, well mounted and under glass, will perhaps be mollified by its harmony. Will he ever guess how the sky or the other adornments crept in?

Thus I have tried briefly to describe the graphite process of working in skies, etc., from imperfect negatives—the simplest method in existence, so far as I am aware. I should, however, add that the use of black and white pencils as a supplement to the graphite is quite indispensable in working in fine details.

The entire sky in the accompanying illustration—Figure 1—(from a carbon print) was worked in with graphite on an almost white expanse; and the shadow in the left foreground was laid there quite affectionately by the anxious author. A real artist, of course, could have done it better in less time than was required to read about it.

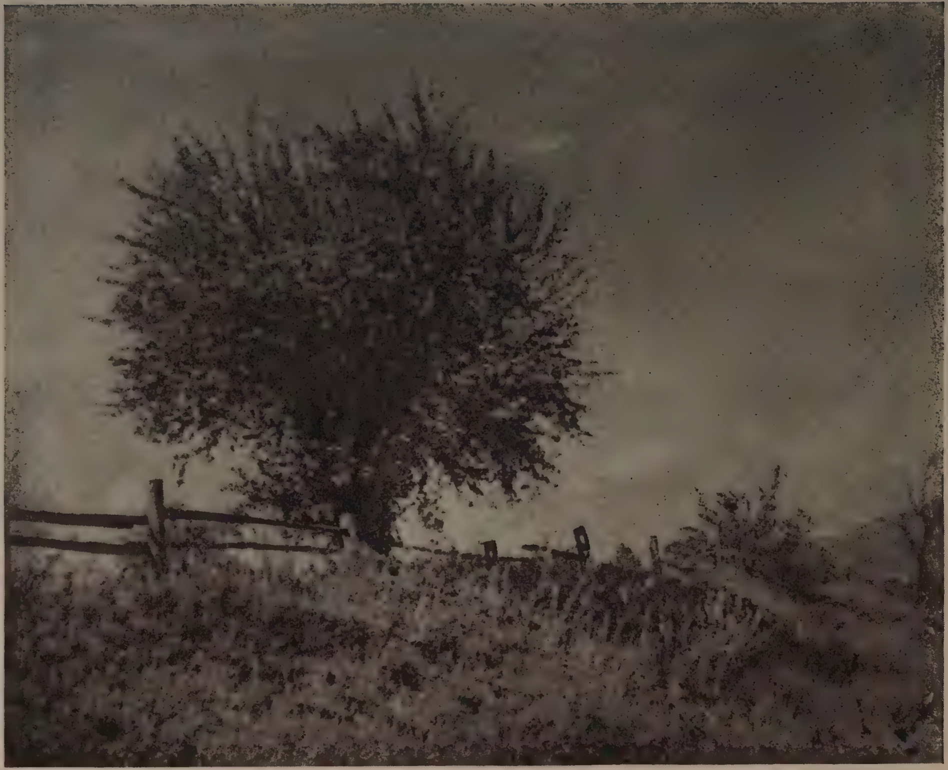


Figure 1.

AGAINST THE SKY.
(Carbon)

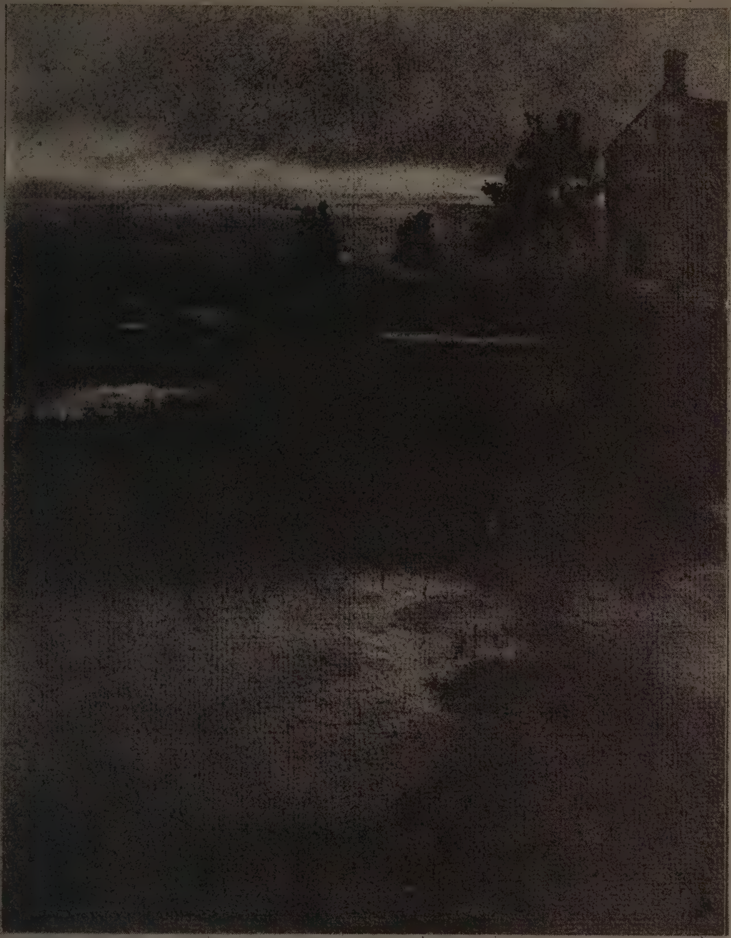
Illustrating article "A Method Of Working In Skies," by Edward Ostrom, Jr.

NOVEL USES FOR SUPPLEMENTARY LENSES

By A. LOCKETT

THERE is rather a tendency to depreciate the use of supplementary lenses, as if there were bound to be a certain inferiority in the results produced as compared with those obtained by the employment of an ordinary photographic objective alone. This is a mistaken attitude, for, as a matter of fact, even uncorrected spectacle-glass supplementary lenses can be made to yield astonishingly good results when used with due regard to their peculiarities and essential limitations. It is especially for emergencies and with hastily-improvized apparatus that the supplementary lens comes off with flying colors. The present article is written to give details of a few actual instances.

On one occasion the writer found it necessary to make some negatives of postage stamps on a greatly enlarged scale—practically low-power photomicrographs, and had no longer at hand the short-focus lens previously utilized for a similar purpose. The obvious solution of the difficulty was to shorten the focus of the available camera lens, a rapid rectilinear of F/6.8 in. focus, by means of a convex supplementary, but the bellows extension was unfortunately too short to give sufficient magnification. A rectangular wooden tube about 2 ft. long was therefore made to fit closely on the back of the 4 in. by 5 in. camera, from which the reversing back and focusing screen were temporarily removed. About an inch from one end of the tube was fixed a panel having a square opening cut in it, as seen in Figure 1, so as to make a light-tight junction on inserting the camera, while the other end of the tube was made to hold the reversing back, as seen in Figure 2. The whole inside was blackened and careful search made for possible pinholes or cracks. The tube is shown complete and attached to the camera in Figure 3. It will be noted that the camera is supported at the front by a thin strip of wood A, to keep it level.



1924

An ordinary biconvex reading-glass of 6 in. focus and 2½ in. in diameter was pressed into service as a supplementary lens. To hold it in position a narrow strip of brass was bent to the shape indicated in Figure 4, and fastened on the handle of the reading-glass by means of wire, as shown in Figure 5. It was then only necessary to hook the bent metal on behind the diaphragm shutter of the camera, thus supporting the reading-glass conveniently in position, in front of the lens, as seen at B in Figure 3.

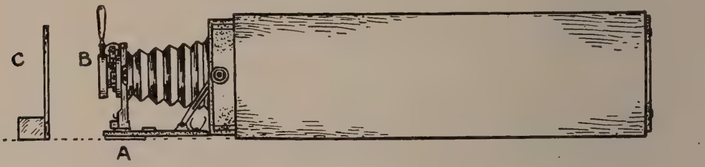


FIG. 3

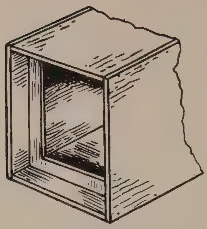


FIG. 1

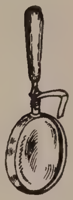


FIG. 5

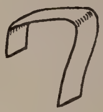


FIG. 4

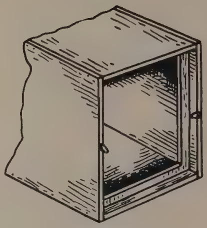


FIG. 2

To hold the postage-stamp, a small easel screwed to a wooden block (C, in Figure 3) was constructed, a very slight touch of photographic mountant in the center of the stamp serving to keep it in place, while allowing its ready detachment when done with.

Figure 6 is an actual specimen of the work executed with this extemporized arrangement. It is a direct photomicrograph showing the head only from an obsolete pre-war stamp of Bosnia-Herzegovina. The linear magnification is eight diameters. For purposes of comparison the stamp itself is shown underneath, and it will be seen that most of the tiny engraved lines, so distinctly revealed in the magnified copy, are quite imperceptible to the naked eye.

The camera lens was stopped down to F/128 as marked on the diaphragm shutter, a rather long exposure being necessary, with light falling on the stamp from a bay window.

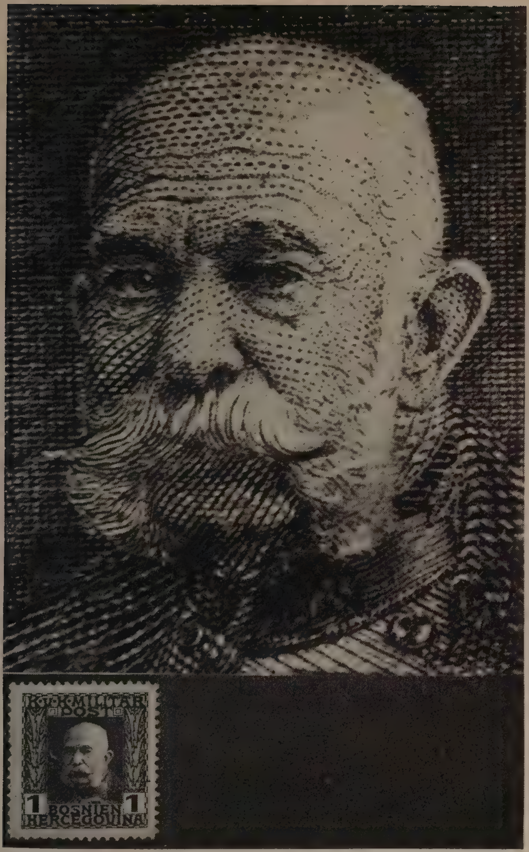


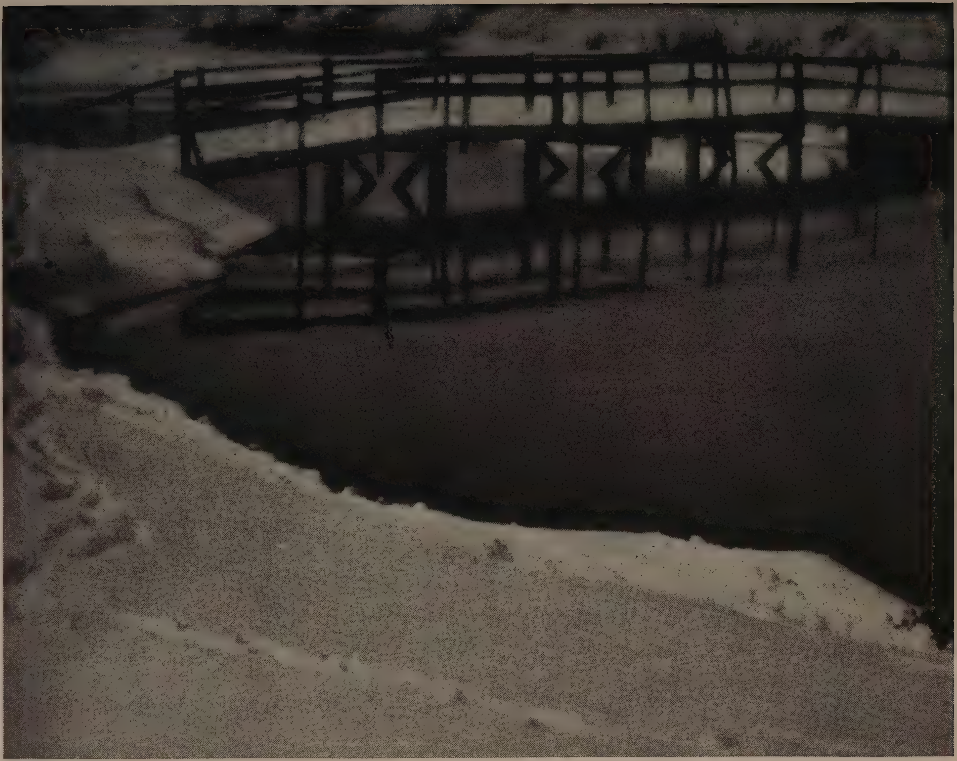
Figure 6.

Another piece of emergency work done with extemporized apparatus was the photography on an enlarged scale of a number of small wireless crystals, for reproduction in the well-known radio journal, *Amateur Wireless*. Nothing happened to be available at the time but a folding hand camera with a lens of nearly 7 in. focus and a single-extension bellows. There was no opportunity of adopting the tube expedient, and it was determined to experiment daringly with various simple uncorrected lenses in an effort to devise a temporary lens of very short focus.

The rapid rectilinear lens on the camera had a brass tube of 1¼ in. internal diameter, a diaphragm shutter being mounted between the two components. After sundry hasty trials, the following highly unorthodox arrangement was contrived. Unscrewing the front portion of the lens, a 3-in. focus biconvex simple lens of 9/10 in. diameter was inserted between the diaphragm and the combination, the latter being screwed on again. This did not affect the movement of the iris. From a blackened spice-box of suitable size a cardboard cap was cut to fit tightly on the front of the camera lens, having in it a circular opening ⅝ in. in diameter. On the front of this cap was fixed (with elastic glue) a 3¾-in. focus biconvex lens of 1⅛ in. diameter, while inside the cap was glued a 3-in. focus plano-convex lens of ¾ in. diameter, with its flat side nearest the camera. The plano-convex lens, by the way, came out of an old telescope eyepiece; the other two glasses were extracted from a cheap toy cinematograph.

The camera, in order to be used vertically, was screwed to the side of a heavy box, in which a narrow slot had been cut to permit adjustment of distance. The crystals were supported on a horizontal sheet of glass with a white reflector a few inches underneath it, and the camera extension used was about 7 in., the crystals being about 1 in. away from the lens. After focusing with as much sharpness as the unconventional lens would admit, the diaphragm was stopped down to F/128 before exposing. The crystals, magnified about 5 diameters, photographed very satisfactorily. Figures 7 and 8 are two specimen prints (reproduced by kind permission Messrs. Cassell & Co., Limited). The first is a crystal of permanite, while the second shows two varieties of galena. It will be recognized that this was a very severe test, since the objects had a varying thickness, and were not on one plane like the postage stamp.

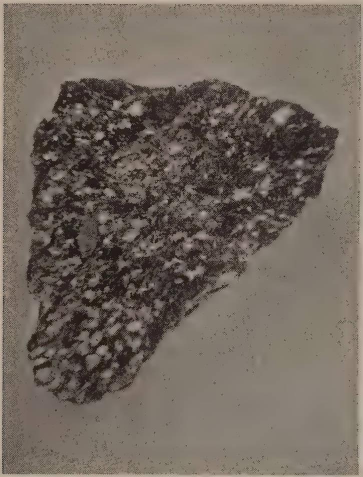
On another occasion, for a magnified photograph of a flat object, the same extemporized lens was used, with the sole difference that the 3¾-in. focus biconvex glass was placed between the diaphragm and the back combination, instead of on the front of the cap. Even this gave a very gratifying result, though, according to theory, almost every correction ought to have been upset. This goes far to demonstrate the remarkable effect of a small aperture in overcoming the imperfections of a lens. It is quite possible that with some



G. H. SEELIG.

anastigmats the uncorrected supplementary lenses might have had a more disturbing result.

In conclusion, the writer entirely disclaims any intention of urging the photographer to use a makeshift when something better is available. Lenses of the right focal length are certainly superior to supplementary arrangements of any kind, even if one only considers their greater convenience and the shorter exposures permissible, while achromatic supplementary lenses are undoubtedly preferable to uncorrected glasses. It is merely desired to point out that even the worst imaginable tools may be made to give good results in an emergency when intelligently handled, and that the possibilities of such last-moment reserves are worth "making a note of," as Captain Cuttle says.



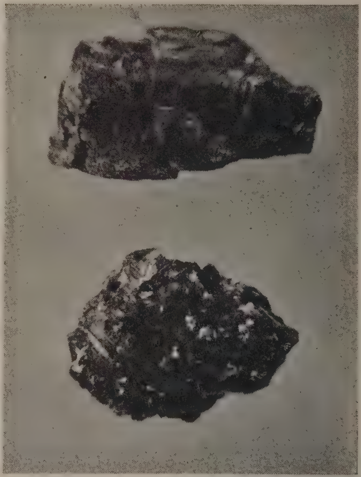


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Figure 7. Figure 8.

Illustrating article "Novel Uses For Supplementary Lenses," by A. Lockett.

TUNING HER UP.

THOMAS CARLYLE.

THE RESIN PROCESS OR RESINOTIPIA-NAMIAS

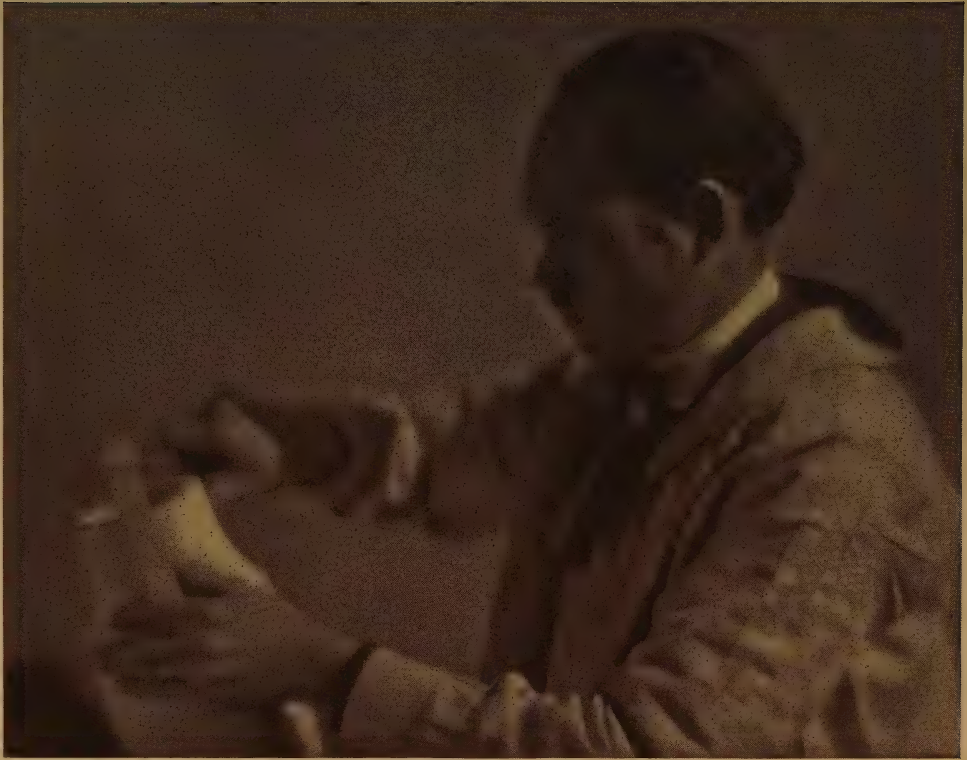
By JOSEPH PETROCELLI

RESINOPIGMENTIPIA—now named for short Resinotipia—is a new photographic process by Prof. Rodolfo Namias of Milan, Italy. Bichromated gelatine paper exposed to the light loses the property of swelling and adhesivity, when immersed in hot water. This is the principle on which this process is based; so if we expose a piece of bichromated gelatine paper to the light, under a *positive,* and then immerse it in hot water, the gelatine in the high lights will be insoluble; in the half tones it will be insoluble in a lesser degree and, in the shadows, it will swell to its maximum capacity.

Now, if we spread colored pigments on the paper, these, in theory, should adhere first in the shadows and then proportionately to the half tones; but, in practice, the powders adhere almost all over and stain the paper. This explains why similar processes were not successful; they had a very short scale of tone gradation. It is due to the studies and experiments of Prof. Namias that his process is practical.

In mixing colors with a greasy material, or with resin, he obtained colored powders which do not stain the paper and adhere only to the parts not, or little, acted on by light; and the adhesion is inversely proportionate to the light action. So by using these pigments, and especially prepared gelatine-paper, we have a long scale of tone gradations from deep black in the shadows to pure white in the high lights; but we get pure whites only by manipulation. The characteristic of this process is that there is always a veiled effect in the high lights, and this is an advantage. With reasonable experience a worker will find it rapid, exceedingly simple in manipulation and decidedly flexible.

The greatest advantage, however, is that the printing is made from a positive (on glass, film or paper) so that the final results are absolutely under control, especially when the



PORTRAIT—FRED WILLIAM CARTER. F. Milton Armbrust.

positive is on paper; because one may modify it in any way desired, with a pencil, crayon or graphite applied with a stump, etc. It is not necessary to have a photographic image as a positive; one may make a resinotipia from a drawing, sketch, etc.

Pigments are obtained in many colors (different colors may be combined to make other shades), and are spread on with inexpensive, round, soft brushes. Unlimited control may be had by addition or removal of pigment. A print is made in a few minutes. Polychrome prints can also be produced.

The results are of great beauty and highly distinctive. All the richness and characteristic qualities of a pigment image are present, but without the glaze or glossiness which some find objectionable in multiple gum, oil or carbon. The resinotipia print consists of a velvety, finely textured matt pigment deposit of great depth, capable of rendering a long scale and varying contrasts. A careful worker may have satisfactory success even on his first attempt.

Gelatine paper, especially prepared, is sensitized by immersion in a 5% solution of bichromate of ammonia, or a 4% solution of bichromate of potash (20 oz. water, 1 oz. bichromate of ammonia is sufficient to sensitize half dozen sheets of paper 11 x 14). Leave the paper in the solution for two or three minutes, and then hang it up to dry in a dark place, as it is sensitive to light when dry. Paper sensitized this way, if kept in a dark envelope, can be used within twenty days during winter and within ten days during summertime.

Printing is done by contact from a positive on glass, film or paper, in diffused light, or strong artificial light. For more detail it is advised to print film to film. Time of exposure varies from one second to one-half hour, according to the density of the positive used and the intensity of light. Printing can also be done in full sunlight, but it is not advisable, if the positive has been too much retouched. High lights and halftones have to be clearly printed, but the shadows must show traces of detail only. Over-exposure will destroy detail in the high lights, under-exposure will clog the shadows.

After printing the paper is washed in running water until the soluble bichromate is eliminated, or, after a short washing, may be left in still water for several hours. Paper so washed may be dried, or may be swelled at once in hot water of about 120°. The swelling has to be plainly visible. If, in a few minutes this does not appear, probably the print has been over-exposed, or else the water is not warm enough. Add a few drops of ammonia to it, but use it sparingly, otherwise it will soften the gelatine too much and modelling of the image will be lost.

If under-exposure is found, use colder water and no ammonia. Place the paper on a plate glass, or other support, blot off the surplus water with a soft cloth and then the paper is ready for pigmenting. Dip a large, round, soft brush in the pigment and spread it all over the paper. Use the brush with a rotary movement, yet gently, to avoid streaks, but at the same time rub in. The image will readily come up. Put more pigment where more intensity is required; remove it where it is not wanted. In removing pigment it is recommended to use a fresh brush. Work first in the high lights. It is easier to eliminate pigment in the shadow later; and, if necessary, use a small, hard brush. Use plenty of pigment, because what is not required for the print can be used over again, when dry and ground in a mortar. More retouching can be done with an eraser or rubber when print is dry.

On a semi-dried print, retouching may be made with a wet, small brush. Prints, when completely dry, may be immersed in a tray of cool water and retouched while under water with a small brush. In this way one obtains pure whites. Or, instead of water, one may use a solution of 10% sodium bisulphite; and, by so doing, eliminate any trace of yellow tint left by the bichromate on the paper. When still damp, the print is fixed by holding it over steaming water for one minute or two.

If the first result is not satisfactory, immerse the print in cold water and with a tuft of cotton remove the pigment, and then start again. Put the print a second time in hot water if swelling was not sufficient. The best negative for this process is a well balanced one or even a flat one. But, as a matter of fact, any negative can be used, because one prints from a positive, and, therefore, one can always get a soft positive from a contrasty negative.

ADRIATIC SAILS. J. PETROCELLI.
(Bromoil)

COPPER PRINTS

By DR. BRAXTON D. AVIS

AS the name implies, these prints are made by employing a sensitive copper salt instead of the customary silver compounds, and developing same with different developers, whereby pictures in suitable colors are obtainable.

The copper salt I employ is the bichromate by itself, or with a small quantity of ammonium bichromate which makes it slightly more sensitive to light.

As an example a solution is made up as follows:—

Bichromate of Copper	1 oz.
Distilled Water	3 ozs.

Paper having a smooth surface is floated on this solution for about two minutes and hung up in a warm dark-room to dry.

Exposure is made under a negative to sunlight for from ten to fifteen minutes, or until all detail is fully printed out. Examination from the back of the printing frame will determine when this is completed. The image should be of a dark brown color on a yellowish ground, this dark reduction product consisting mainly of basic cupric chromate.

The print is removed from the printing frame and washed in running water for twenty minutes to get rid of all of the bichromate not acted upon by light. The image appearing at this stage of the process as light yellow brown, and after blotting off the excess moisture is ready for development.

The choice of several developers can be used. For instance: if the print is developed in a solution containing just pyrogallic acid, the image is immediately changed to a dark brown. If a little sodium sulphite is added to the solution containing pyrogallic acid, then the print will develop to a sepia brown.

Also the same result is obtainable if the dark brown print developed in pyrogallic acid is put in strong solution of sodium sulphite. Employing aniline salts instead of pyrogallic acid, prints in different shades and colors are obtainable.

If the print is developed in a strong solution of aniline hydrochloride the image will change into a green color. This

AN OLD SOUTHERN HOME. FEDORA E. D. BROWN.

green picture after a thorough washing can be changed immediately into a dark blue by dipping it for a few seconds in a diluted solution of copper bichromate.

Either the green or blue picture can be changed into a pleasing purple by dipping it into a solution of either ammonium per sulphate or calcium hypochlorite. This last color is not very permanent and slowly reverts back to some shade of blue.

No doubt there are other chemical re-agents which could be employed as developers for producing these colored pictures, such as the toluidine salts, etc.

Another way in which these prints may be obtained, and I have secured some fair results, is to take a silver image and treat same with a solution of copper bichromate. The silver composing the image reducing the copper salt similarly to the action of light, only very much faster. After this treatment the picture is well washed and developed with the same developers I use for the printed out pictures.

I have not had sufficient time as yet to devote to this phase of the subject, but merely mention it here to show the possibility of utilizing copper bichromate for practical photography.

ROCKBOUND COAST. EDWIN FRANKLIN DREHER.

CARBON PRINT. ING. A. NIKLITSCHEK.

TEST IT

By C. H. CLAUDY

NOT that it needs it; the manufacturers have given you a kodak which is as near fool proof as the arts and science of photography, and of manufacturing, can provide. But test it anyway, for the fun of making the tests and the knowledge you will gain by thus experimenting.

That the proof of the pudding is in the eating is undoubted, yet no one ever learned how to cook pudding by eating it.

The test of a kodak is the picture it makes, but no one ever learned the "innards" of photography, merely by making photographs.

Hence, test for yourself and see what you can find out about this kodak of yours.

How fast is its lens? What is the focus of the lens? How fast is the shutter?

You can substitute a ground glass for film, and with a foot rule, measure the distance between lens and glass, and get a close approximation of the focus of the lens. But it is not an accurate measurement, since the real focus is from the optical center of the lens, whereas a physical measurement is from the rear combination of the lens.

There are several ways of finding out the real focus of your lens, but the use of a pencil, paper, ground glass and pair of compasses is the easiest.

Focus a distant church tower on the left side of the ground glass, and mark the spot on the glass with a pencil. Shift the rear of the camera keeping the lens in place so that the same church spire appears on the right side of the ground glass. Mark the position on the glass. Have your kodak rest on a sheet of paper, and draw lines along the side of the instrument on the paper, when it is in the two positions. This gives two sides of a triangle on paper.

The distance between the two points you marked on the ground glass, measured with compasses, is to be fitted between the sides of this triangle, so that both angles thus

TAPESTRY. William Gilchrist.

made are equal. This provides a complete triangle on paper. The distance from apex to base, measured on a line vertical to the base, is the focus of the lens.

Having the lens *focus,* we now want the lens *speed.* For this purpose we want a cap for the lens. A pill box will do if it is made to fit tightly over the barrel. If the lens is concealed behind the front board, and thus has no barrel, we won't be able to be quite so accurate, but we can be reasonably so.

We use the ground glass, as before, but this time we cover it with a dark paper in the center of which we punch a pin hole. Having the instrument focussed on infinity, we set the kodak down on the table and put a light source behind the pin hole in the paper which covers the ground glass. Inside the lens cap we put a piece of sensitive paper, velox will do, but bromide is faster. The instrument is allowed to rest for a minute or two, after which the paper is developed. The size of the dark circle is, within very narrow limits of error, the effective opening of the lens. Knowing the focus, we can soon calculate the speed. Thus if the focus is at six inches and the image circle three quarters of an inch in diameter, we know the F. value of the lens is 8 ($6 \div \frac{3}{4} = 8$).

If the kodak have no lens barrel, press the sensitive paper flat against the front of the instrument, over the hole behind which is the lens. The resulting dark circle won't be quite so accurate a measurement of lens opening as if there was a lens barrel, and thus the possibility of getting the paper close to the lens, but it will be accurate enough.

In all these experiments a ground glass is necessary, but it is not necessary that it be a part of the instrument. Kodaks are not usually supplied with ground glass. The film and the protective back occupies its place. But if the film is taken out and the back off, a piece of ground glass can be put across the rollers, ground side *in,* and be as effectively used for such little tests as can the screen or larger instruments in which it forms a part.

There are plenty of ways to test the speed of a shutter, and some of them are very difficult and abstruse. Others are very simple. Among these none seems easier than putting a bicycle on its saddle and handlebars, attaching a narrow strip of white paper to one spoke of the rear wheel, and then taking a photograph of that rear wheel while it is being revolved by the pedals, a certain number of times per minute. It will be necessary to know the ratio between the pedal sprocket and the rear sprocket, in order to know how many times the rear wheel turns while the pedals revolve once. If the pedal sprocket has 36 teeth and the rear sprocket 9, obviously the rear wheel makes 4 revolutions to one of the pedal. If, therefore, the pedals are revolved 60 times a minute, the rear wheel revolves 240 times a minute, or 4 times a second.

The photograph made of the revolving wheel will show a blur, which is caused by the narrow white card attached to the spoke. It will be easy to calculate from the extent of this blur, how much of a revolution was made by the wheel during the exposure. If it appears that the wheel has made one fourth of a revolution, then, as there are four revolutions per second, the shutter was open for one sixteenth of a second. Such a test is not accurate for very fast exposures, because of the difficulty of measuring the amount of a very small blur, but for any ordinary kodak shutter, which makes at its most rapid speed an exposure of the one hundredth part of a second, it is quite accurate.

HIS SMALL CASTLE. E. TANKAI SUZUKI.

THE PILOT. T. W. KILMER.

THE SMALL CAMERA FOR STUDIO WORK

By T. W. KILMER

UP to a few years ago my 11 x 14 Studio Camera was used exclusively for all of my portrait work. I felt that it was an absolute necessity to employ a large camera in order to obtain a good result in portraiture.

I now use it but occasionally. With a smaller camera one may make many more negatives than with a larger camera. You feel that you are not spending as much money when using a smaller size film than when every shot at 11 x 14

TRAFFIC OFFICER. T. W. KILMER.

costs you half a dollar. Even an 8 x 10 film costs about twenty cents.

For the past few years nearly all the portraits I have made are done with a 5 x 7 camera using but one half of the 5 x 7 film for each exposure. A piece of stiff, black cardboard is slipped over one half of the 5 x 7 back, so that but one half of a 5 x 7 film is exposed at a time. Using the 5 x 7 film, always horizontally, we can make two exposures 3½ x 5 inches each on a 5 x 7 film. Three double holders give us one dozen negatives.

I generally use a Carl Zeiss F/4.5 lens of 10 inch focus, as this seems to be about right for a 3½ x 5 film, and will give no distortion, even with fairly good sized head portraits.

Out of say a dozen exposures there will be two or three that usually are very good likenesses.
mercial film, and enlarged paper negatives used for final

Straight projected prints (I dislike the word "enlargement") are made from these, or contact positions are made on com-
multiple gums.

Why waste large plates, films and paper when small negatives projected, give such beautiful results,—results that not only equal, but in many instances surpass the larger contact prints.

MISTY DAY, EAST RIVER. JOHN ALLEN.

FROM THE DECK OF THE WRECK. LOUIS F. BUCHER.

FOCUSING BY PARALLAX

By J. E. FOSS

PARALLAX is the term used to denote the relative movement which takes place between two objects at different distances from the eye as the eye is moved from one position to another. Thus, if the first fingers of each hand are held so that they are in line with one eye, and at different distances from it, an apparent motion will be observed between the two fingers as the eye is moved from one side to the other.

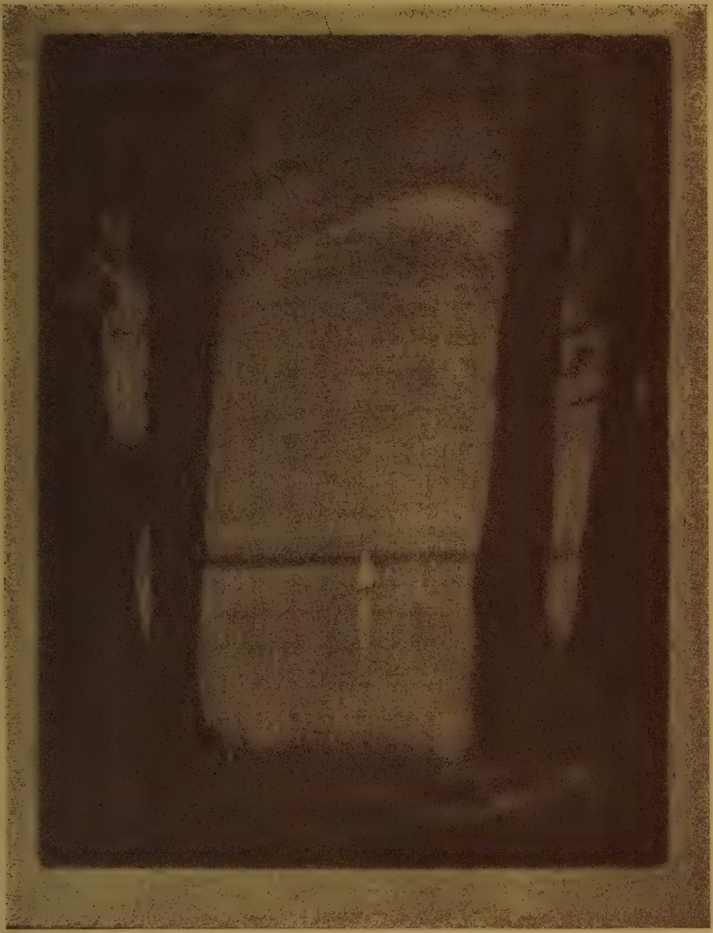
Perhaps the best example of parallax, commonly seen, is that between the hands and dial of a watch or clock. In order that the hands may revolve freely there must be some distance between them and the dial, and it is well known that the hands appear to show a different time, depending upon the angle at which they are viewed.

A plate is in focus for a certain object when the emulsion side of it lies in the same plane as the image of the object formed by the lens of the camera. The plane in which the image lies is often called the "focal plane." In case the plane of the plate does not coincide with the focal plane, we get the effect of parallax. That means, that if we had some way of viewing, at the same time, the image of a given point of the object, and a certain point on the plate, there would be an apparent motion between them as the position of the observer was changed.

This may be gone about in the following manner:

Obtain either a clear piece of glass with a portion of it ground, or a ground glass with transparent portion. In either case the transparent portion should be ruled either with a number of parallel lines, or with cross lines, so that the relative motion can be more easily detected.

In Figure 1 the object is located at X, and the image of the object is at Y, at the correct focal distance away from the lens. We assume that the object is so small that it is sensibly a point. Now, the point on the new focusing screen, that is marked by the intersection of the cross lines, may be



DISTANT SAIL. William Gordon Shields.
(Gum Print)

located at F1, F2 or F3. In the first place, it is too close to the lens; in the second, it is in accurate focus; and in the last, it is too far from the lens to be in focus.

Consider the case when the point is at F1. As the eye is moved from the position of A to the position of B, the image appears to move in the opposite direction; viz.—as the eye is moved from right to left, the image appears to move from left to right with respect to the reference mark (cross lines) on the glass plate. If the plate were at F3, we would have a similar motion, but in the opposite direction. If the focusing plate were so placed that the reference mark on it was at F2, coinciding with Y, there would be no relative motion between it and the image. Obviously, the position at

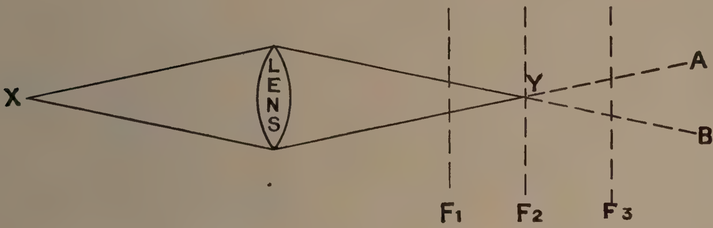


Figure 1.

F2 is the desired condition for accurate focus. The essentials of the method are as follows:

1. Bring the subject roughly into focus on the ground portion of the glass.

2. Select some small and convenient piece of detail of the object that is in the clear part of the glass, and that falls near one of the lines marked on the glass.

3. Note whether this selected part of the visible image appears to move or to remain stationary, relative to the marks on the glass, when the eye is moved through a short lateral distance.

4. Remember that if the image moves with the eye, the glass is behind the focus (in position F3). If the image moves in the reverse direction, the glass is in front of the focus (in position F1). If there is no visible movement of the image with respect to the marks on the glass, the focus is as exact as possible.

Focusing by parallax is by far the most accurate method and has the advantage that it is not necessary to judge the quality of a poorly-lighted image as in the ground glass method. It is ideal for dark interiors, etc.

MY SHIP O' DREAMS W. R. MC ASKILL.

HOME OF THE LOWLY.

IRVING BERKEY.

PORTRAITURE BY AN AMATEUR

By M. K. PENRICE

I SUPPOSE that ninety-nine per cent of amateurs start with a more or less cheap camera, and the first exposures made are probably snapshots of friends or relations in the garden.

The results are very interesting to the photographer if he keeps a "sunny memory" album, but hardly flattering to his friends as portraits, and if be becomes really keen on the hobby of photography, he will, in all probability, give portraiture a wide berth and confine his more serious attention to landscape.

This, not because portraiture no longer appeals to him, but because realizing his own limitations, he thinks it will be easier to attain perfection in another branch. He thinks portraiture is only possible for the professional, that it requires long months spent in learning the art of retouching, and that no successful portrait is ever taken excepting in a studio with an elaborate arrangement of curtains and skylights.

This short article is to show the fallacy of such ideas, and to try to convince any amateur who is keen on this, to my mind, most fascinating branch of the art, that he may, with perseverance and a little knowledge, learn to turn out pleasing work. This will probably in time become more artistic and convincing than that of the ordinary professional, for as the amateur has only himself to please, he can select his own models, arrange and clothe them as he pleases, and in most cases throw retouching to the winds without the risk of offending affluent clients.

Now with regard to apparatus, it may be interesting to some if I describe my own lenses and other paraphernalia.

Apparatus. Whole plate studio camera, fitted with a silent pneumatic shutter and a Dallmeyer Special Portrait Lens 18 in. focal length, working at F/4 with soft focus diffuser.

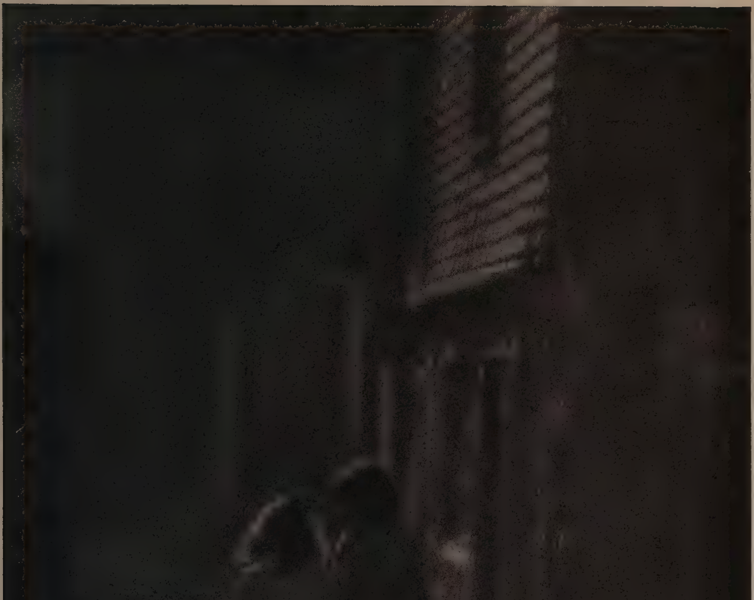
Half plate stand camera fitted for a Spencer-

THE LONE TREE. P. F. SQUIER.

	Portland soft focus lens, 9 in. focal length working at F4/5, or a Dallmeyer 8½ portrait lens working at F/3.
Plates.	Marion Iso-record. 500 H. & D. Developed for a soft negative if required for bromide enlarging.
Developer.	Pyro-soda without bromide, well diluted.
Exposure.	Always on the full side.
Studio.	A tiny drawing-room on the ground floor, lighted on S. W. side only, with 5 windows in a bay.

I may say that an 18 in. portrait lens with an aperture of F/4 is an expensive luxury. The feature of this lens is that, when doing a head and shoulders, the length of focus and big aperture enable one to focus the eyes of models sharply, and allow the other planes to fall into varying degrees of diffusion which gives perspective. The ears for example thus fall back into their right plane. For artistic effects however I prefer the Portland soft focus lens (a much less expensive instrument). I stop this lens down to approximately F6/8 to avoid excessive halation. The characteristic of this or similar lenses is that it gives a delightful luminosity and softness, unobtainable by any other means. Being only 9 inches in focal length it is necessary to get a rather small head on the negative (not bigger than 2 or 2½ inches) or distortion will ensue. This can be enlarged to any size. The great feature of this lens is that with it retouching is absolutely unnecessary.

Now a word on lighting. If working in a room without top lighting one must wait until the sun is low enough to light the subject well on one side, that is unless one has a studio facing North. A reflector is required to soften the shadow side of the face, but it must not be placed too near the cheek or the reflected light will be strong, especially if white paper be used, and false lighting will result. The exact amount of lightening the shadow needs is only learned by observance and practice. Try by means of pulling up or down the blind or blinds, or by blocking up the lower half of the windows to get such a light that the sitter's face is *well modeled.* The light should fall in such an angle as to strike the most prominent portions of his physiognomy, *i.e.,* the forehead, nose, check-bones and chin. High lights should, therefore, show on these features, and a well modeled portrait will result.



CONFIDENCES. M. K. PENRICE.

This is the most usual form of lighting, and the one which gives the best modeling to a face. It should be thoroughly mastered first before trying experiments in "stunt" effects. The camera and lens should look down slightly upon the sitter, for this will give prominence to the forehead.

Any dwarfing of the seat of intelligence is a bad fault, and one which beginners are very apt to fall into, by placing the lens below the eye level of the sitter. Get the sitter to look into the lens. This is the easiest position for the eyes to be photographed in, but do not let him get a fixed stare or even a slight squint, by keeping his eyes in this position for too long. Just a moment to enable the operator to focus the eyes is enough, then ask him to look away without moving the head till the moment of exposure, when the eyes can be turned to the lens again. I rarely place a sitter square to the camera, for shoulders are generally too broad. Illustrated by "Study of a girl" (Figure 1). If placed sideways with head turned towards the camera, the shoulder furthest away will be diffused and recede into the distance. Be careful, however, that the shoulder which is nearest the camera be not posed stiffly. I always ask my sitters to relax their muscles and make them as limp as possible.

Another point to remember is that the hands should always be included if possible as they are usually characteristic. I say "if possible," for if the sitter cannot pose them naturally it is better to leave them out of the picture. There is a great difference in the class of portraits which are hung in the leading exhibitions to-day to those which passed the judges some years ago. Then a good portrait, properly exposed, well lighted, and well posed was all that was required. To-day, unless it happens, as well as possessing all these qualities, to be the portrait of some well known public personage, it would not be likely to be accepted, however good the technique, unless it were something more than a portrait. To be this it must be a "study." The difference between a portrait and a "study" is rather subtle, but I will try to explain in the following way:

A study must be more than the mere reproduction of the sitter's features. It must portray a character, an emotion, a mood, or sheer beauty of line, and one or more of these to such a degree, that the viewer does not want to ask "Who is

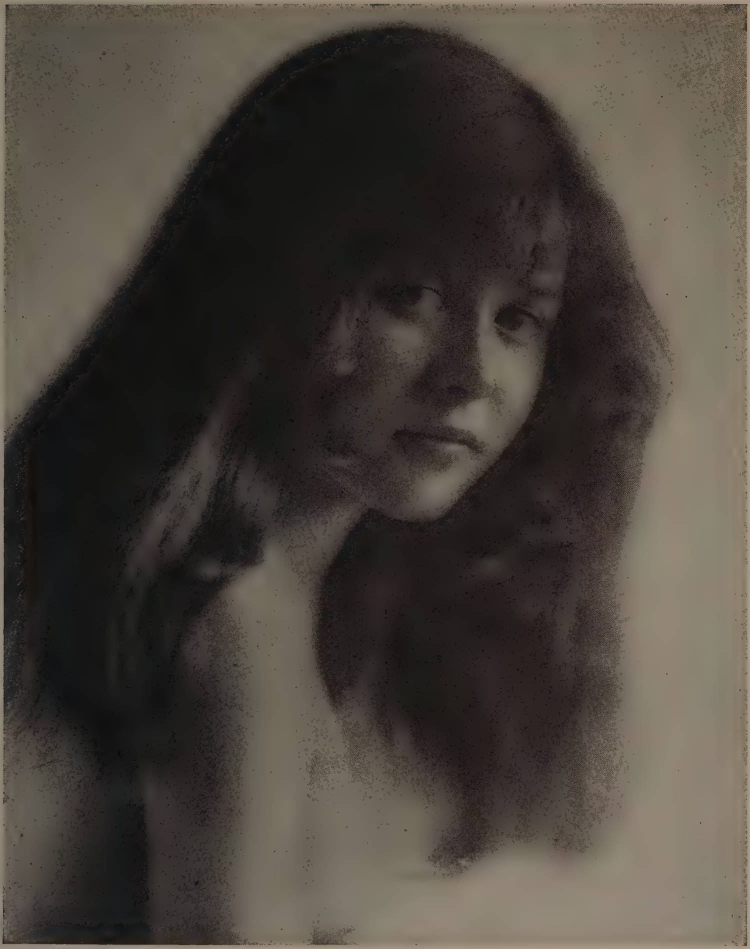


Figure 1.

STUDY OF A GIRL.

Illustrating article "Portraiture By An Amateur," by M. K. Penrice.

this?," but realizes the artist's meaning, as in "The Awakening" (Figure 2).

When photographing children for instance, try first and foremost to preserve the chief attribute of childhood-simplicity. To my mind it is an error to drape a wee girl of four or five summers in chiffon, to look like a grown woman in evening dress. If one studies the best examples of childhood at exhibitions one can see that they are all childlike in pose and expression. They are in fact studies of varying phases of *childhood*.

If you photograph a baby, take him doing a babyish thing, such as sucking his thumb or both thumbs, playing with his toes, laughing, crying, or stretching out his arms, in fact in any attitude which is peculiar to his age, and you will then be representing in your picture, not a portrait of so and so's youngest hopeful, but a study of *babyhood*.

With older models, when attempting to make a study in contradistinction to a portrait, remember that clothes play an important part. They must be as impersonal as possible. When painting allegorical figures, the old masters draped their subjects in the flowing Greek garments which give impersonality at once. Modern dress to-day, especially the garment known as a "Jumper," is the bug-bear of the would-be artistic photographer!

It is impossible to get such atrocities to lend themselves to any arrangement of sweeping curves, which play such an important part in building up the composition of a picture. This brings me to one of the most important points in artistic portraiture, for without good composition a picture can never be pleasing. There are several fine American works on this subject and I can do no more here than give a very crude idea of *composition* in portraiture.

Perhaps the first thing to be learned is the proper spacing of that subject. If the space of either negative or paper to be filled be crossed with four imaginary lines (Figure 3), what is known as a correctly spaced picture is that in which the principal lines follow the imaginary ones, and the correct placing of the principal features of the composition would be roughly at any one of the four spaces where the lines intersect. Now, the reason will be seen, which is a puzzle

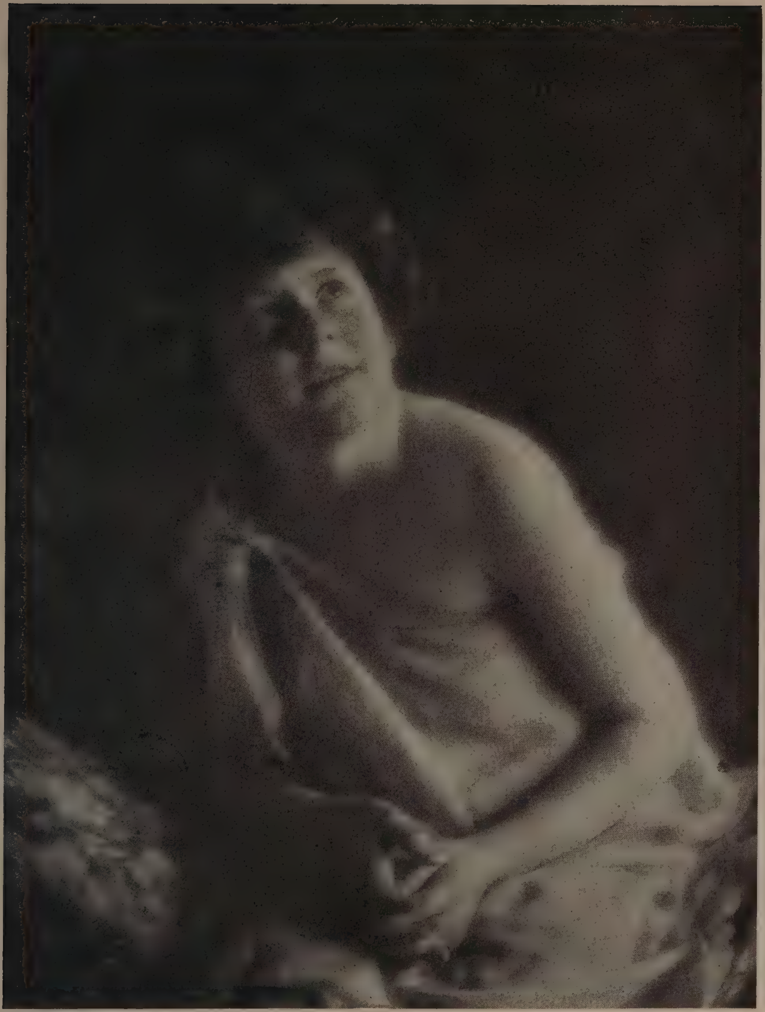


Figure 2.

THE AWAKENING.

Illustrating article "Portraiture By An Amateur," by M. K. Penrice.

to so many, why a portrait is sometimes "trepanned" ("The Monocle," Figure 4).

This should only be done for one reason, *i.e.*, to bring the eyes of a head study up into the "picture space" as the spaces marked a, b, c, d, are called. Should a ¾ length portrait be required, the proper spacing would be to place the head at approximately a or b, and the hands at c or d, where they would form a "balance" to the principal subject, the head. This passing reference to *balance* will serve to give a little idea of what that term means in composition.

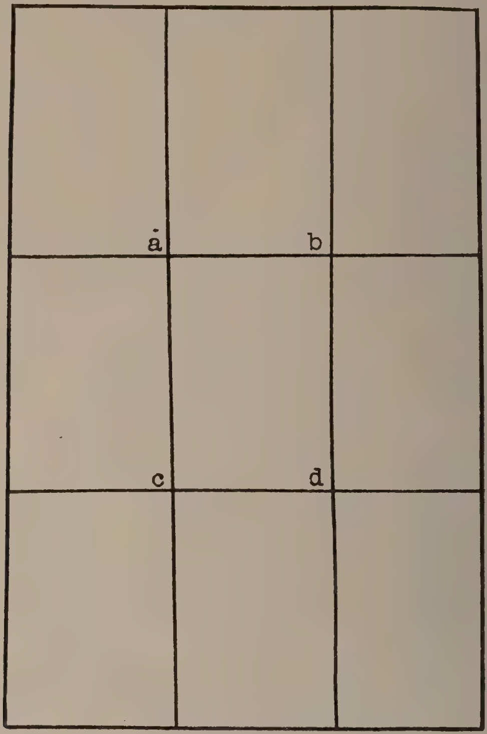


Figure 3.

Try to avoid straight lines, which are anathema to art, and arrange the subject so that the principal lines form an imaginary S. This figure is called "Hogarth's Line of Beauty." At this point may be seen the importance of the flowing robes referred to before, as the lines of such can be arranged to carry on and complete the natural curves of arms and body.

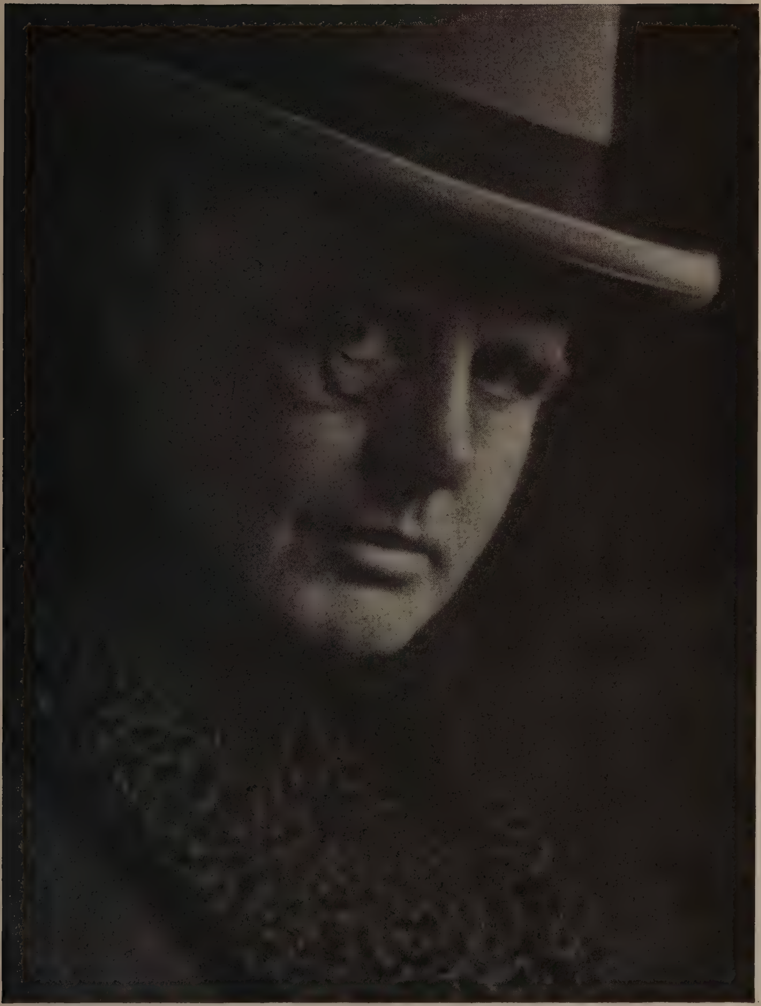


Figure 4.

THE MONOCLE.

Illustrating article "Portraiture By An Amateur," by M. K. Penrice.

The endless interest of portraiture, and the variety of poses and lighting effects which may be obtained are so enthralling that an amateur will be well repaid for the time and trouble involved in experimenting; and in conclusion, I will say that I trust this article may help those beginners in this branch of photography, for whom it is written, and that the more advanced workers will pardon me if I have wearied them.

THEODORE EITEL.

A SUNDAY MORNING.

GEO. F. BELAIR.

WHAT ONE LENS WILL DO

By CHARLES H. PARTINGTON

WHEN a person is first struck with the idea of taking up photography, and he or she visits the dealer to obtain a camera, the most notable requisite seems to be the size of the picture. Considering that the purchaser of the camera is a beginner in the complete sense of the word, all the talk of the dealer concerning lenses, shutters, etc., is too deep to digest. Should the beginner be one of those who do not merely press the button, but goes into the game deeper day by day, the time will come when the lens receives its proper share of consideration.

After various lenses have been tried and the merits of many others, as exploited in advertisements and catalogues, have been digested, one soon acquires the knowledge that there are many fine picture-making glasses on the market. These lenses then divide the attention of the advanced worker into four main groups, viz: three anastigmats such as the moderate speeds of F6/3 to F7/7, the fast lens of F4/5 to F5/6, and the extreme apertures of F3/8 and greater. The fourth group is the soft or diffused focus lens which is obtainable in several speeds.

If a worker really takes to photography it is not long before he covets a faster lens and it may be that with a start of, say F/8, the change is made to F6/3, then F4/5, etc. Getting deeper into the game increases interest, and eventually leads to pictorial work. Following this branch of photography, one soon learns the importance of the focal length of the lens, and it is then realized that making pictures, not merely photographs, demands attention from four sides.

These four sides are sharp focus, soft focus, speed and focal length. By this statement it is not intended to convey the idea that pictorial photography depends entirely on these points, but the fact remains that the many varying conditions that govern the making of pictures by photography demand at one time or another, one or more of the four lens con-

SHADE AND SHADOWS. Hiromu Kira.

ditions mentioned. If the subject is a street scene, or one that contains action, we want a fast lens. If depth is required and speed is not essential, we want a slow lens. Both of these requisites are obtainable in a fast lens by stopping down for the second condition. Again, we might have a lens on the camera the focal length of which is too long, and to get the proper view we must change to a shorter lens, as there is no space to back away from the subject. Regardless of speed or depth, we must necessarily carry lenses of somewhat different focal lengths. For another subject we find that the anastigmat can be discarded in favor of the soft focus.

After considering all of the above points we can sift the matter down to the stage that to be equipped for various conditions our outfit must include at least two lenses of different focal lengths, and a soft focus objective. The writer has carried his battery of lenses many times, and often wished that the laws of optics were more pliable, so that all of the three conditions named could be confined to one lens. Strange as it may seem the wish has become a fact, and I am the proud possessor of such a lens in three sizes.

This lens has an adjustable mount for the front combination which when revolved does not merely separate the combinations by a small fraction of an inch as is done by some of the so-called diffused effect anastigmats, but separates the units quite a bit. The operation of this revolving mount will give an image ranging from extreme sharp to extreme soft. The sharp image is brilliant and all that one could wish in an anastigmat, even at the full aperture of F3/8. The extreme soft image has so little flare even under great contrasts that it is difficult to detect. The quality of the soft image, in my estimation, is better than that of any other lens I have used. Not only does a worker have the advantage of extreme soft or sharp images, but by setting the lens between these conditions, it is possible to obtain any degree of diffusion desired. The range is unlimited.

Due to the change in the relative position of the front and rear combinations when used as a sharp or soft lens, there is a change of focal length, and consequently a change in the speed of the lens. On the smaller lenses the variation in focal length has a range of one inch and in the largest, this variation is two and one-half inches. The speeds of all lenses, regardless of size, have an extreme of F3/8 sharp to F4/5 soft.

For general outdoor work I use a 3¼ x 4¼″ R. B. Graflex fitted with a lens of 7½″ focus when sharp which changes to 8½″ when soft. This range of one inch in focus is a very great advantage on a 3¼ x 4¼″ image. Added to the beauty of this range in focal length is the fact that you are not confined to taking a soft picture with the long focus. Simply stopping down will eliminate the soft image and produce a sharp one.

From the above the reader can readily see that in one lens you have either a slow or fast objective by means of the diaphragm, an anastigmat or soft focus lens, and a long or short focus within very practical limits. To top off the whole matter, one can be assured that this new lens is not merely a fad. It is a very high grade product produced by an optician of long experience who stands at the head of his profession.

The lens has been named in a manner that truthfully designates its uses, namely, the "Variable," manufactured by the Graf Optical Co., South Bend, Ind. It is variable not only in producing images from extreme soft to extreme sharp, but also in the property of a variation in focal length.

S✓

ON THE BUFFET. CHAS. H. PARTINGTON.

APARTMENT HOUSE PHOTOGRAPHY

By MARK W. STEVENS

WHEN one reads the title of this article, I presume, many of you will think that I am referring to my pet hobby; viz.: architectural photography. However, I am not going to discuss anything of the sort. What I am going to write about is photography in the confined quarters of the modern apartment house. There must be many confirmed photograph "fans" who are living in apartments without the conveniences of a dark-room; possibly many who would enjoy doing more or all of their own work, but are at a loss as to how to get all of the required paraphernalia in such restricted quarters. To these, I hope, this article may prove of interest and of help.

There have been many articles in the *Annual* on bits of photographic apparatus, and on various and sundry darkrooms, but I do not remember ever having seen one that applied particularly to the photographer living in an apartment; hence, I hope that this little description of how I manage to work in a comparatively small space will be of help to others in a like situation.

My Mother and I have what is ordinarily known as a three-room apartment. We have a fairly large living-room, which is also used as a dining-room, two bedrooms, a bath and a kitchenette. This means that all my work must be done in my bedroom; also that all of my photographic apparatus must be kept there too. Some ten or more years ago, when we first moved into an apartment I was confronted with the problem of keeping a good deal of what Mother was pleased to call "stuff" in a very small space. I set my mind to work to see how I could make everything that would fold foldable, and to eliminate, as far as possible, all unnecessary equipment.

Figure 1 shows a bookcase that contains all of my smaller bits of apparatus, chemicals, etc. The top shelf holds 8 x 10 and smaller trays, stirring rods and thermometers, timer clock, stock of film, and the cloths which I use for laying out prints

NICKOLAS MURAY.

to dry. The shelf below holds all of my chemicals, with the exception of hypo (which I buy in 15 lb. lots and store in my closet). Those of which I keep only a small stock may be seen on the left on a series of steps. These are metol, hydrochinone, pyro, bromide, potassium ferricyanide, potassium bichromate, potassium permanganate, ferric-ammonium citrate, oxalic acid, and a few others. Next are larger stock bottles of sodium sulphite and carbonate; next my balance and to the right of that are ordinary and chrome alum, sodium bisulphite and sodium acetate. The third shelf holds copies of the *Photo-Miniature* and one or two other handbooks on photography, small printing frames, graduates and the film hangers for open-tank development of cut film. In the center is a small box containing various odds and ends which I use frequently; a safety-razor blade trimmer, etching knife, small screwdriver, and a small pair of pliers. Next to it a can of glue, some Ambroid cement, and a bottle of red ink solution for holding back thin parts of negatives. The bottom shelf holds the three tanks for development, rinse water and fixing bath (two of them by-the-way are hard-rubber battery

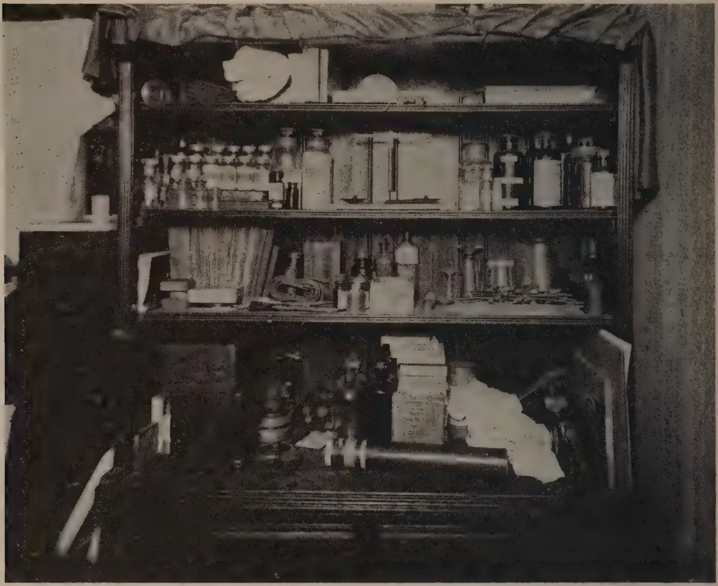


Figure 1.

S✓

THE INTRUDER.

DR. ARTHUR NILSEN.

jars); a little used plate rack for drying plate negatives, and some other articles not strictly photographic. The bottom drawer holds printing paper, 8 x 10 printing frame, an envelope of mask charts, dry mounting tissue, a reserve bulb for my enlarger, a seldom used tripod stay, pestle and mortar, and a few other pieces of photographic materials.

Developing is done on a small folding sewing table. This is placed in front of the book case shown in Figure 1, as there is a wall-bracket here in which I have an Eastman safe light lamp. With my three tanks on the table and the film hangers just in front development proceeds quickly and easily. As my film stock is on the top shelf within easy reach reloading of my holders is carried out in an expeditious manner and it is rarely, or never, that all my holders are not loaded. The films are washed by laying them in the bath-tub with the water conducted to the far end thereof through a small hose and rose bath nozzle. The over-flow is through a rubber disk and tube placed over the open drain hole. The negatives are dried in the hangers suspended from a line that runs across my room about six feet above the floor.

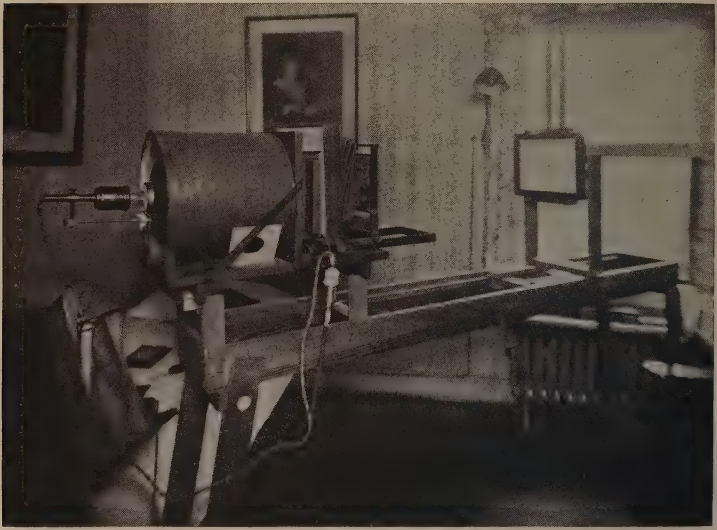


Figure 2.

My printing is practically all done by projection (my negatives are 4 x 5). Figure 2 is a general view of my enlarg-

FINDING TREASURES ON THE OLD BRIDGE. P. F. Squier.

ing equipment. This piece of apparatus, as may be observed, folds on itself until, when ready to be put away, occupies a floor space of about 4 by 8 inches in a corner of my closet. The light box contains a "12-E Parallex" mirror condenser, is detachable from the rest of the enlarger, and is stored on the closet shelf. The easel-holder is held upright by a couple of hooks at the back, and for storage folds down into the bed of the apparatus, as do also the uprights which hold the light-box and projecting camera. The legs fold up outside the enlarger bed. The enlarger is not ordinarily used in the position in which it is shown in the picture, as it would take up too much valuable floor space, but is set parallel to the bed. The filling of the printing frame, and my stock of printing paper, is laid out on a small drawing-board set across the arms of a Morris chair which ordinarily stands under the reading lamp in the background. The trays for development, rinsing and fixing are on the small table already referred to, the light in the lamp being changed to a No. 0 Eastman safe-light. The exposure is timed with a timer-clock which is set on top of the lamp-house, and the current turned off and on by the push-button socket which may be seen hanging just in front of the negative carrier. In use the back of the lamp-house is covered with an old rubber focusing-cloth to prevent egress of light into the room.

Figure 3 shows the easel holder. It will be noted that the upright and cross pieces of the enlarger are slotted, and that they are held together with a bolt and wing-nut through separate pieces which slide in these grooves. A slight loosening of the wing-nut enables me to move the printing frame up, down, or revolve it in a vertical plane to register vertical and horizontal lines in the print with the edges of the printing frame. This is a very handy arrangement, and one which I can most heartily recommend to all of my fellow workers who do enlarging.

I referred in the preceding paragraph to the use of a printing frame in the enlarger. I find that this is the most satisfactory way to hold the sensitive paper for printing, no glass being required and the paper lying in the frame as flat as could be desired. It also enables me to dispense with the use of the usual ruby cap over the lens when adjusting the paper. The printing frame is equipped on one edge with a stop that butts against the horizontal bottom piece of the easel holder (as may be seen in Figure 2). When the picture is focused and the frame removed and filled with the sensitive paper for the print, it *must* go back into exactly the same position that it occupied when I was focussing. For a focussing

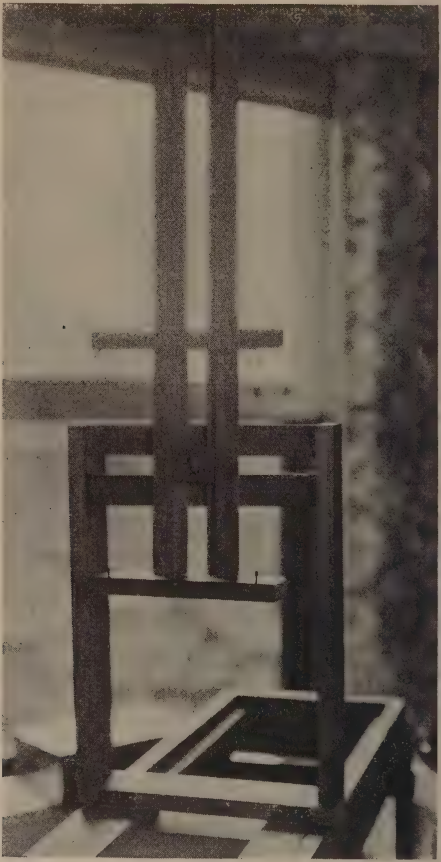
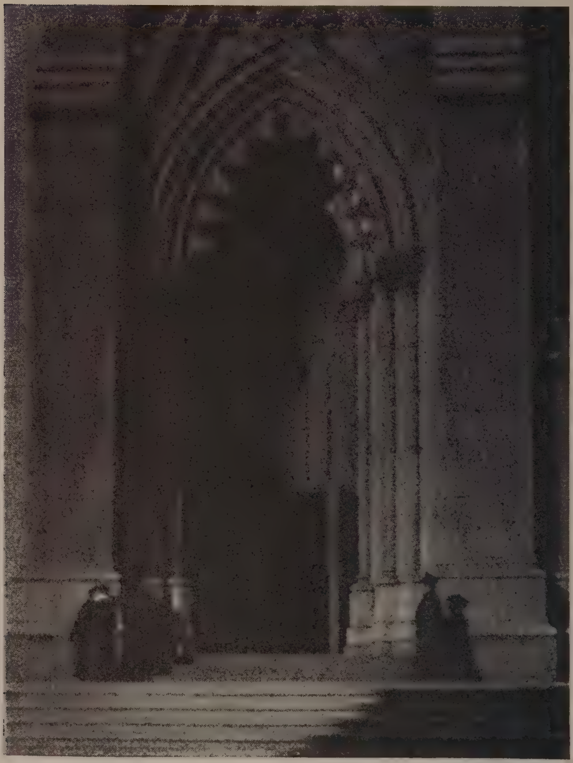


Figure 3.

surface I use a piece of 8 x 10 glossy paper which I fixed, washed, ferrotyped and drymounted on a piece of heavy mounting board. This has a small handle on the back made with a bit of adhesive tape so that it is never necessary to touch the face with the fingers. When the frame is put away this bit of board is reversed, with the glossy side in, so that

HORACE B. LIVERIGHT. RABINOVITCH.

it is protected from abrasion or other mechanical damage while it is not in use. The front of my printing frame is painted a dead black, as I found that when bits of clear film, such as that covered by the slides in the film holders, came on the beveled edge of the frame they would reflect light back on to the sensitive paper and fog or cause light grey strips to appear in the sky, or any other high light adjacent thereto.



DOORWAY, ST. PATRICK'S CATHEDRAL, NEW YORK.
WILLIAM GORDON SHIELDS.

HOUR OF SOLITUDE.

TAIZO KATO.

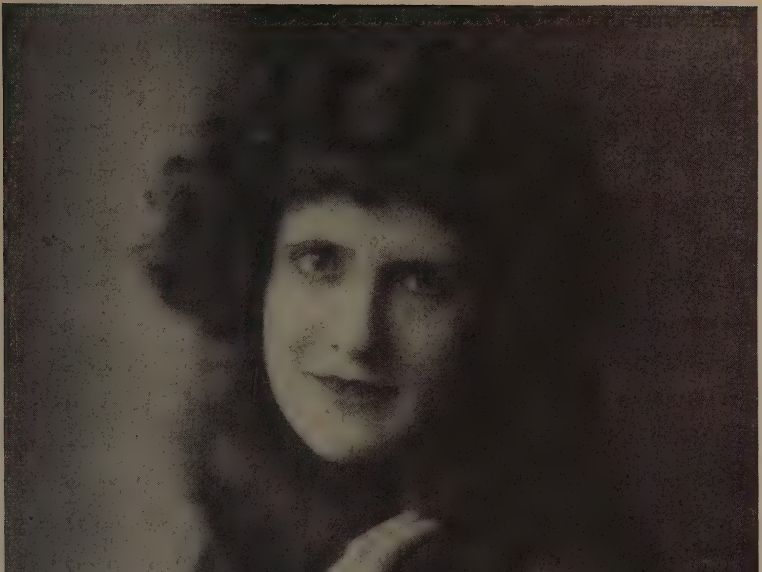
POCKET CAMERAS

By A. H. HALL

IT is but a few years since the amateur, who only boasted a quarter plate hand camera was considered a dilettante; the hall mark of the serious worker was the possession of a stand camera of a size not smaller than half plate. The photographic trade has set itself out to popularize photography, and one of its slogans has been "portability." The consequence is that the earnest worker may perhaps possess a quarter plate reflex which he will use near home, but smaller cameras are now the rule, and it is a matter of some importance to inquire whether the practice of photography has suffered. For the ordinary snap shotter it may at once be said that not one in ten of those who use cameras would have started the hobby if it had entailed the labor of carrying the old fashioned apparatus.

This class of photographer, which is of course numerically far the strongest, is not critical as regards the results, and although his expenditure on apparatus and materials is all for the good of the trade, and reacts in favor of the other users, his appreciation of the facility with which mementoes of his holidays and amusements can be obtained, is no criterion as to the soundness of the prevailing fashion.

Other amateur photographers may be divided in two classes, those to whom the artistic side makes appeal, and the technician. The dividing line between these two is quite indefinite,—the man who produces technically, perfect results may entirely lack any artistic inspiration, or training; the artist on the other hand may be a perfect technician, and there are many grades between these two extremes. Let it not be inferred that the artist can ignore technique, he cannot; but correct exposure, proper development, and adequate printing are not primarily concerned in the consideration of size of camera. The professional has shown signs of recognizing the small camera, and advertisements of firms who specialize in making projection portrait prints, *i.e.,* fixed size enlarge-



. THE FUR NECKLET. C. E. WAKEFORD.

ments from small negatives, show that there are commercial possibilities.

For technical work, however, he remains firm in his predilection for contact prints of considerable size. The inference that those subjects which do not require the most critical definition, artistic landscape work, figure studies, athletic sports, and even portraiture, can be adequately handled in small sizes is a strong one. It is true that many exhibition pictures are made from large negatives, though many are not; but the worker who makes a large negative from a small one does so either to utilize some process which is not otherwise available, or to introduce a measure of control into the result which can be easily reproduced on subsequent prints. The successful use of very small negatives does, however, entail very careful procedure if the results are to uphold the protagonists of the pocket camera, and the considerations may conveniently be divided into the manipulation of the camera and subsequent operations with the plate.

The portability of the small apparatus makes for opportunities of use which would frequently be missed if larger cameras only were available, but it has also led to the neglect of the tripod which is one of the features of present day photography, so that many negatives are underexposed. A small amount of underexposure may be bad enough in a large negative, but any area of clear gelatine in a negative which requires considerable enlargement is absolutely fatal. On the other hand, these small lenses are actually faster than their larger brethren of the same relative aperture, and if a suitable shutter is fitted, the omission of the tripod may be condoned in many instances.

For serious hand camera work, it is, therefore, essential that the lens has a large aperture and the shutter accurate slow speeds which can be operated without shake. A frequent design of stirrup print with a downward release to the shutter, in a position which entails an acrobatic performance on the part of the index finger, is responsible for more failures, due to movement, than anything else except underexposure. The shutter should have an easy release with a horizontal movement, preferably toward the body. The short focus requisite to cover these small plates permits of lenses of extreme aperture being used without the necessity for focusing either

Nickolas Muray.

with a reflex camera, or on the ground glass of the back screen, which is essential with such lenses in the larger sizes, so that subjects are possible which are outside the range of any other apparatus. The popularity of certain small cameras so fitted is apparent in numerous press illustrations in the daily papers, and the newspaper man finds that acceptable whole plate enlargements are quite possible from even portions of a 4½ x 6 cm. plate. Except at the widest aperture focusing is perhaps too easy, and a certain amount of carelessness at all ordinary distances is not attended with the retribution which such laxity deserves.

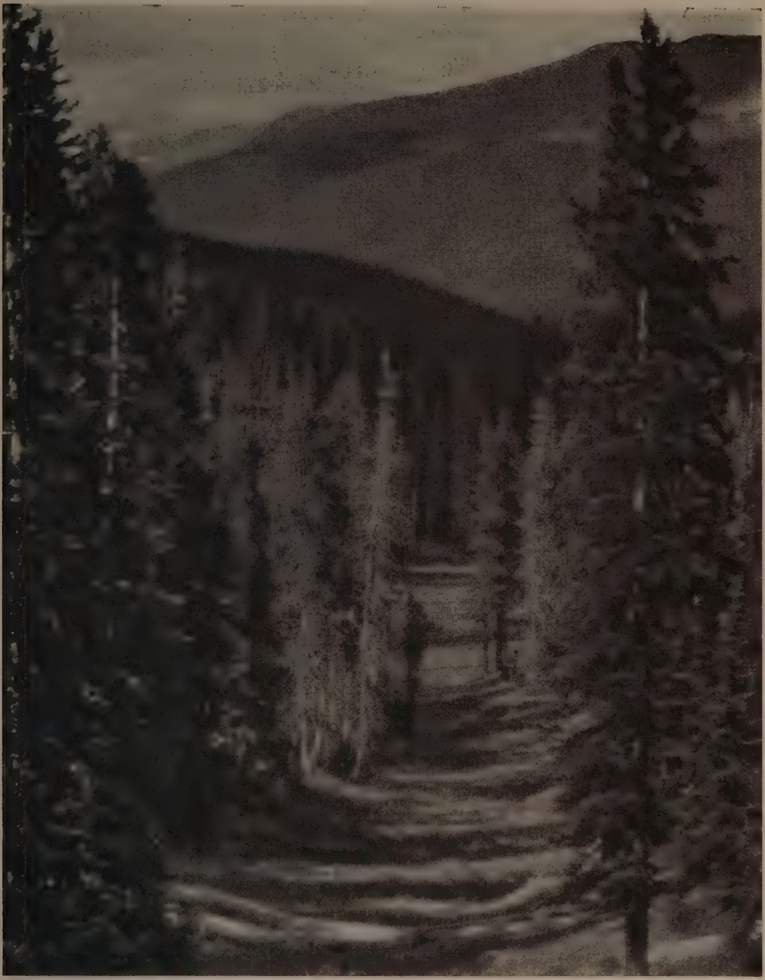
There is, however, some misconception on the standard of sharpness necessary, it being obvious that a very small negative must be correspondingly sharper than one of double the dimensions if both are to be enlarged to the same size. Of course, as the enlargements get greater so does the distances for viewing them, so that it is possible to lay down standards which will be fine enough for almost any size enlargement, and yet not too fine for practical needs. Without going into the theory or calculations on this subject, two useful points may be mentioned. Any small lens will render all objects from 50 feet to infinity in sharp enough focus for any reasonable scale of enlargement when the F value equals the focal length, *e.g.*, this condition will obtain with a 4 inch lens at F/4, the pointer of the focusing scale being set to 100 feet, the hyperfocal distance for the degree of sharpness assumed. Similarly if the scale be set to 50 feet, everything from 25 feet (a most useful distance for figures, etc.) to infinity will be in focus when the F number is twice the focal length, *e.g.*, in the example above a 4 inch lens will fulfill this condition at F/8.

The ordinary amateur who is content with half plate prints has considerably more latitude in depth of focus than is here indicated. When the negative has been properly developed (it should appear rather more flat than one is accustomed to with a larger negative), it should be carefully examined, and any blemishes, however small, must be carefully touched out, or they will be very prominent on enlargement. If the negative has been adequately exposed, and focusing in the enlarger is done critically, first rate enlargements should be produced, but where the exposure has been insufficient, as in high speed work, sports, racing, etc., the effect of forced development on a high speed plate may be painfully apparent in the shape of grain. The elimination of grain in such circumstances is often impossible, but quick development with a developer which gives a heavy stain image will allow the negative to be in the solution for a minimum time, and this coupled with the slightest diffusion on enlarging will enable as good a result as possible to be obtained.

The obvious saving in cost of plates or films has not been emphasized, though it has the additional advantage that duplicate exposures of the more valued subjects are more probable. Enough has been said to show that in some branches of work, or for certain special subjects, the small camera has definite advantages over all other sizes. For the vast majority of subjects it can be used with satisfaction and success, though probably the average of results is hardly better than is obtained by the users of larger apparatus, due to the fact that the technique necessary for really first class work is somewhat exacting.

The hypothesis that out of the many who use a small camera, and who would never possess a large one, a greater number will reach the requisite standard to get the best out of their hobby, than would be obtained from the few who would take the trouble to use the bulkier apparatus, is speculative, but in the author's opinion is a probable one. The inexpert and uncritical majority will have small contact prints produced from their somewhat faulty negatives, and will get more satisfaction from these than they would from larger sizes which would show the defects in an aggravated form.

It is, therefore, my considered opinion that the small camera is unlikely to be ousted from its position of popularity, even if the cost of materials were to be greatly decreased. The majority of users will continue to be attracted by the portability and the cheapness, and the minority will find that these same points with the attendant advantage of availability at all times, will well repay the trouble and care necessary to make their work a credit to themselves.



AN INTRIGUING TRAIL. C. BLICKENSDERFER.

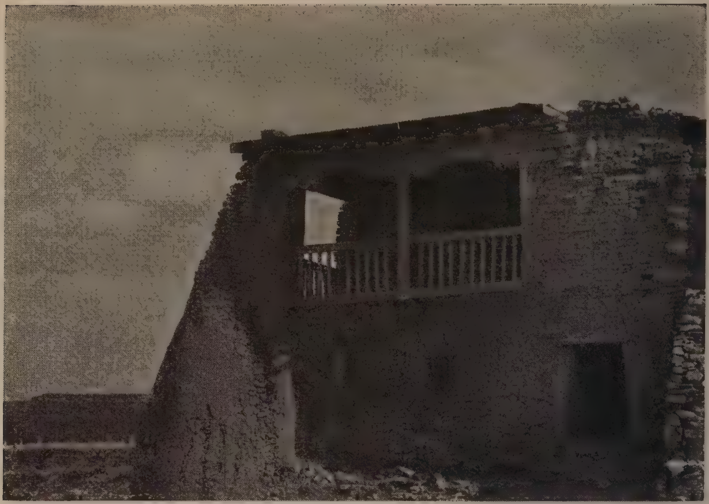


Figure 2.

SPANISH BALCONY.

Illustrating article "Indian Notes," by George Steele Seymour.

INDIAN NOTES

By GEORGE STEELE SEYMOUR

THE pictures accompanying these notes were made at or near the old Indian pueblo of Acoma in New Mexico, the "City of the Sky." This settlement is built on top of a rock about three hundred feet high and the houses are arranged in three parallel streets. Coronado, the Spanish explorer, passing this way in 1540, found the Indians living here in much the same way as they live today. Elevated locations were originally chosen for defensive purposes, but although the emergency has passed, conservatism holds them to their old locations. During the day the men farm in the valley below while the women make pottery.

The approach is up a huge sand drift to a point where it meets the rude staircase cut in the rock and worn smooth through centuries of contact with bare feet. At the top one is greeted by the chatelaine who offers safe conduct for person and camera in exchange for a toll of one dollar. This, of

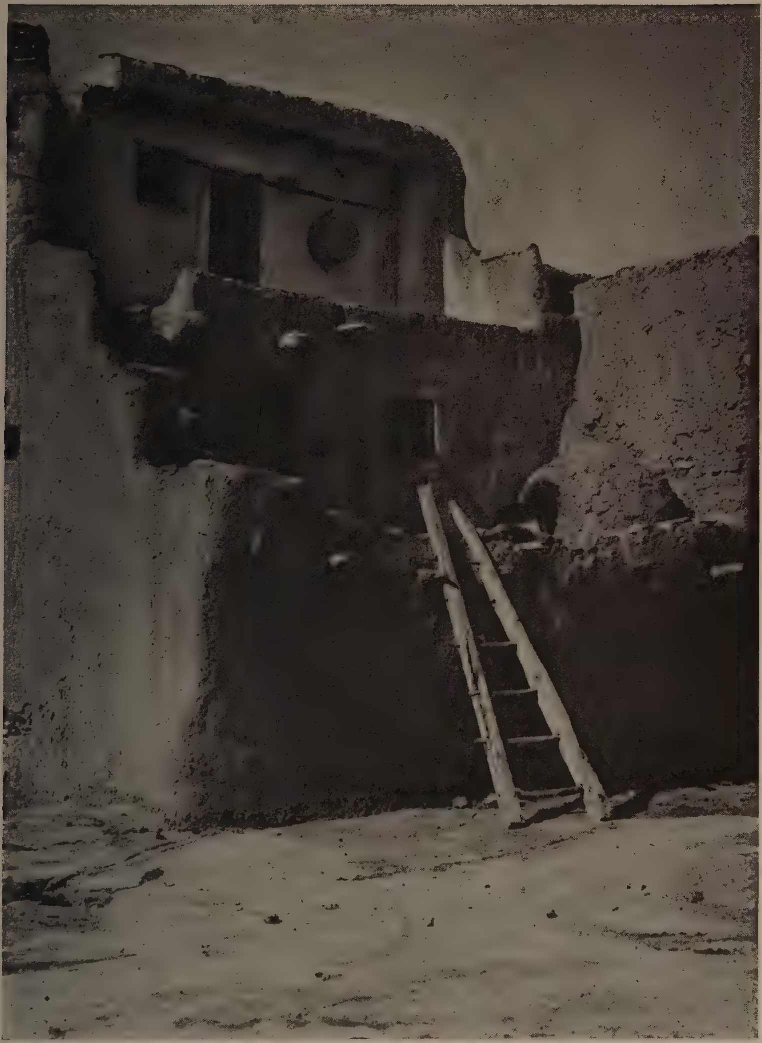


Figure 1.

A PUEBLO DWELLING.

Illustrating article "Indian Notes," by George Steele Seymour.

course, is a recent innovation. The narrow streets extend edgewise before us. Most of the houses are three-decked, and the approach to the upper stories, as shown in the picture (Figure 1), is sometimes by ladder and sometimes by rude adobe steps. The houses of today are not antique, for repairs are seldom made; when a house shows signs of decay it is abandoned and a new one built on some other location. But the settlement itself is of prehistoric antiquity.

The Spanish cathedral stands apart from the houses in ruined grandeur. The tiny churchyard in front of it clings to the very edge of the mesa. Three hundred years have invested the building with dignity, and although it is no longer weather-tight, one quite expects to see the great doors swing open and a religious procession issue forth, just as in old Seville. Our illustration, "Spanish Balcony" (Figure 2), shows a corner of the cathedral close evidently once devoted to living quarters of its functionaries. The figure of a padré reading his breviary would be a natural accessory to such surroundings.

But the only figures in sight besides our own are those of a group of Indian women who detect in us a potential market for wares of their own manufacture. These they carry in baskets or on their heads. Here we have native American art in all its primitive robustness. The pottery decorations of Acoma are peculiar to Acoma and are not to be confused with those of Santo Domingo, Zuñi or Hopi. Jars, gourds, saucers, placques of course form the bulk of their stock, but there are also match-boxes, ornate clay baskets, dolls, and even a tiny pair of shoes tied together with a string.

The leader of the group is evidently a lady who takes her art seriously, for she desires us through the interpreter to take a picture of it. It has been said that these Indians object to having their pictures taken. Most Indian objections yield to the argument of coin; but I found it a much better plan not to attempt any indiscriminate snap-shotting among them, but after visiting in an Indian's home, making his acquaintance and chatting with him for a while, a request to stand for a picture would readily be complied with. Every pueblo home has its rack laden with kodak views, snap shots of the children at play, the boys and girls who are away at school, and other subjects dear to the average heart. The

REPEATED SHADOWS. HENRY A. HUSSEY.

(Bromide)

problem of photographing Indians is the problem of photographing strangers of any race, except that the Indians are much more accommodating about it.

Within sight of the rock of Acoma stands another rock of romance—the famous Enchanted Mesa (Figure 3). Eight or nine hundred feet this monster rises straight up in the air with sides so steep that, according to report, no man has ever been able to scale them. We see it now as the first Spanish explorers saw it nearly four hundred years ago—as the Acoma dwellers have seen it day after day for years untold by any existing record. On its top, unvisited save by storms, dwell the ghosts of all things past. Perhaps some day an aeroplane will discover it for us and tell us there is nothing there but brush and debris. Shall we have gained anything?

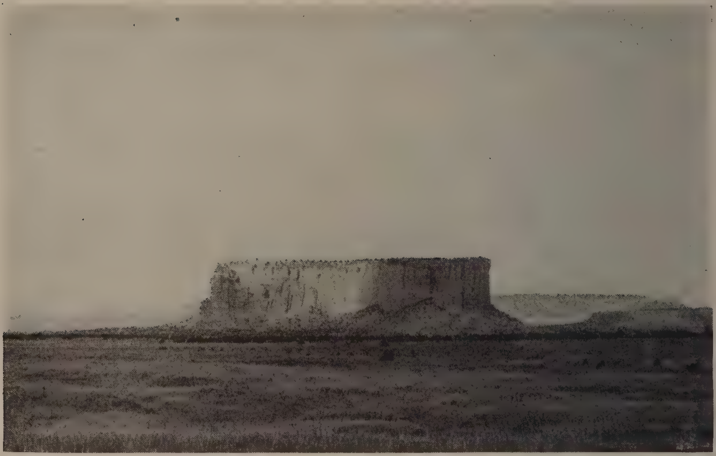
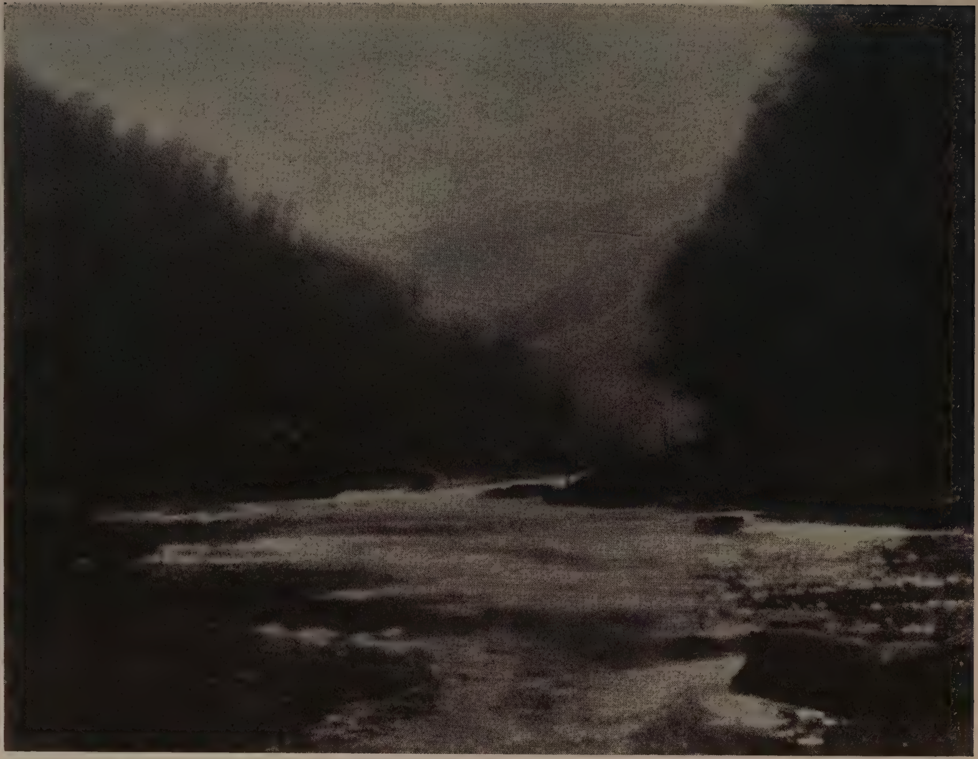


Figure 3.

THE ENCHANTED MESA.

Illustrating article "Indian Notes," by George Steele Seymour.



A MOUNTAIN STREAM. CHARLES K. ARCHER.

MINIATURE PRINTS BY THE GUM-BICHROMATE PROCESS

By WILLIAM GORDON SHIELDS

MUCH has been written for and against the gum-bichromate process as a means of photographic expression. Many have contended that it was only good for board effects, and I have come across writers who have insisted that a gum print was useless if produced under 8 x 10. My readers will no doubt recall many of the other drawbacks which have been listed against this, to me, one of the most interesting and most beautiful of the photographic printing processes, if properly done.

After many years' experience in gum printing, I have come to the conclusion that the disrepute in which this process has found itself, through prints offered for exhibition, has been entirely due to lack of technique, sufficient perseverance in attaining that technique and invariably endeavoring to hasten results at the expense of the print. When I see a poor gum print, and there are many that should never have reached the mounting stage, I do not condemn the process, but I do condemn the worker as being careless in his technique.

While most of my gum printing has been in the large sizes, generally through paper negatives, most, if not all, of my experimenting has been done with the small original negatives, 3¼ x 4¼, 4 x 5, etc. The small prints were made in order to test the printing quality and color effect of the gum-bichromate mixture. Even multiple prints were made in these small sizes, and I found that making these small gum prints was perhaps more fascinating even than making large prints.

Gum-bichromate is one of the easiest and cheapest of the printing processes, and yet, perhaps on account of its extreme simplicity, is one of the most difficult. It is not messy as some would lead us to believe, the messy looking print merely being an indication of the careless worker.

So far as quality and gradation go, it is possible to make

THE HOUR OF TWILIGHT. WILLIAM GORDON SHIELDS.
(Multiple Gum)

gum prints whose scale is just as long as that of a platinum print, and with a quality often surpassing that of the latter.

Success in obtaining good prints by gum printing depends upon practically the same things as do good prints by any of the other printing processes. The better the negative, the better the print. If quality is lacking in the negative, no amount of printing in any process will put it there.

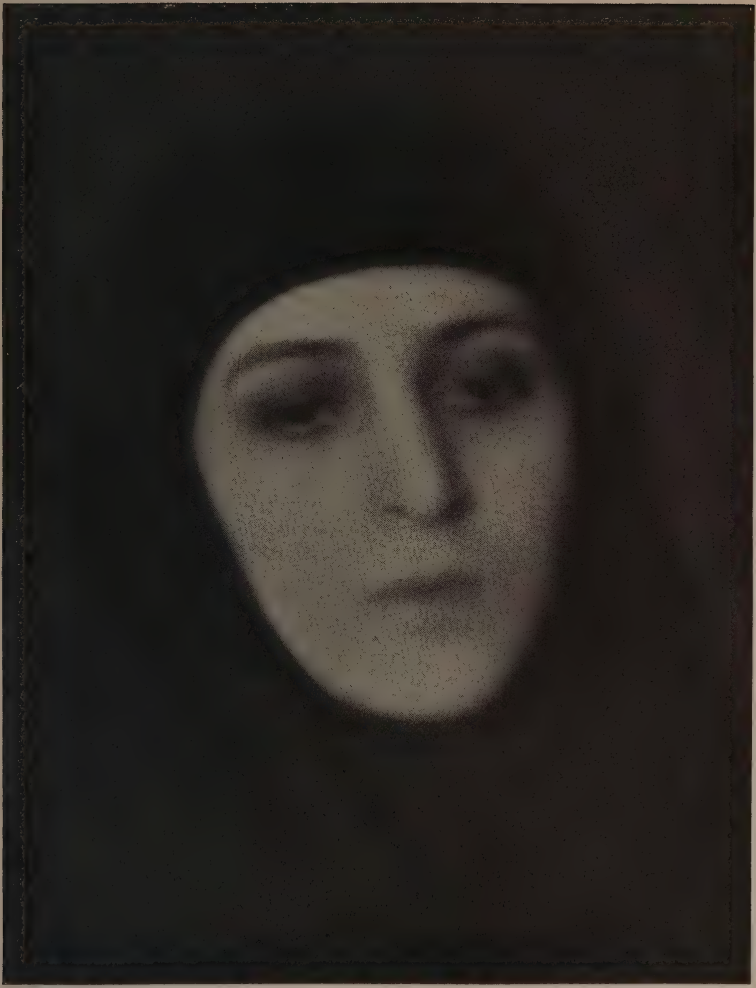
While this article refers to miniature gum prints, it may be applied to large prints just as well. The mixtures if carefully compounded will give excellent single prints. It is interesting to note here that many of these small gum prints have been accepted and hung by leading exhibitions. If multiple prints are desired, a somewhat different coating mixture must be used.

Much more could be said and in greater detail, but in order not to try further the patience of the reader, I give below the results of my own experience.

Brushes: 2½″ "Rubberset" camel's hair varnish brush, single thickness. One or two small ox-hair brushes and small camel's hair brushes to assist development. 3½″ Badger hair blender.

Paper: Almost any paper may be used, but I prefer to choose a paper which does not have to be prepared for the coating mixture. The best papers to use are those which have varying degrees of roughness (they should not be smooth), they should contain some sizing, and it is important that they float. The roughness assists coating and the floating quality assists developing. Several French hand-made papers are excellent, such as Arches, Perigot, Rives, etc., obtainable from the Japan Paper Company, New York City, Arnold drawing papers. Angora paper made by the Whiting Company is excellent and not so expensive as the hand-made papers. It does not shrink nor stretch. This is an important item in multiple printing, but need not be considered seriously in single printing. A good test for the proper kind of paper to use is this; take a pen and ink, make one or two strokes on the paper—if the line is well defined and does not spread, the paper will hold the coating on the surface, where it should be.

Pigments: I use Winsor & Newton water colors in tubes, although other makes will probably be found satisfactory,



A NUN. RABINOVITCH.

but I prefer the uniform and good keeping qualities of the foregoing make.

Gum: Gum arabic in tears—the purest obtainable. Place 4 ounces in a piece of fine cheese-cloth, suspend in 6 ounces of water in a wide-mouthed bottle. It will take one or two days for gum to dissolve, after which add ten drops of a 10% solution of Sodium Hydroxide or Formaldehyde as a preservative. Do not allow this gum solution to become too old, as pronounced staleness interferes with the working of the process.

Sensitizer:	Ammonium Bichromate	1½ ounces
	Manganese Sulphate	1 ounce
	Water	10 ounces
	Potassium Bichromate	1 ounce
	Water	9 ounces

Formula No. 1—Warm Black Single Prints

Lamp Black—squeeze out in small mortar	⅞ inch
Burnt Umber	⅜ inch
Raw Sienna	¼ inch
Indian Red	⅛ inch
Gum: Dip out and add to color 6 measuring teaspoonsful, which equals	6 drachms

Stir well with pestle.

Add Sensitizer:	Ammonium Bichromate	4 drachms
	Potassium Bichromate	1 drachm

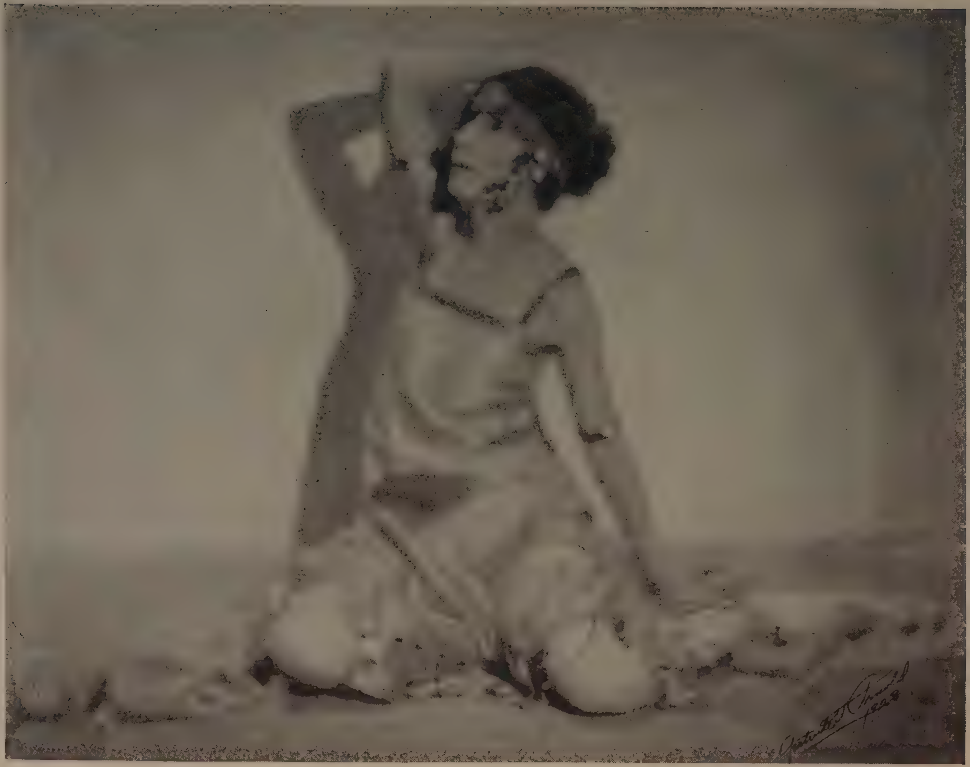
Stir well and add five or six drops of plain ammonia.

Formula No. 2—Warm Sepia Single Prints

Lamp Black (following above procedure)		⅜ inch
Burnt Sienna		¾ inch
Venetian Red		3/16 inch
Chrome Orange		3/16 inch
Gum		6 drachms
Sensitizer:	Ammonium Bichromate	4 drachms
	Potassium Bichromate	1 drachm

Add five or six drops of ammonia as in Formula No. 1.

Coating: First cut up a dozen 5 x 7 sheets of the paper to be coated. For a 3¼ x 4¼ negative, make a 5 x 7 mask with an opening about 3 x 4, lay two or three thicknesses of newspaper or other stiff paper on a drawing-board and pin the corners of the 5 x 7 sheet down with glass-headed pins.



THE DANCER.

GERTRUDE THOMAS ARNOLD.

I usually allow the camel's hair coating brush to rest in the coating mixture in order to become well soaked with the mixture. Squeeze off surplus on edge of mortar and coat two or three small sheets of waste paper. A few minutes' practice will indicate how much mixture is necessary. The full 5 x 7 sheet does not have to be coated—simply a light stroke about four inches across and one inch from top, then three or four gentle down strokes, long enough to give a good clean surface equal to the area of the negative. Experiment at first, coat one sheet as lightly as possible, the next one using a little more mixture in the brush. Finish coating without delay, place brush back in mortar and immediately take up badger hair blender, holding tip at right angles to paper, make five or six quick dusting-like strokes up and down and across, only allowing the tips of the hair to touch. I pull the shades down and coat by artificial light. At this stage the coated sheet should be pinned up in dark closet to dry, which takes but a few minutes. The paper is then ready for printing.

Negative: The print depends entirely on the quality of the negative. It is, therefore, important to select the best possible—a good average negative, correctly exposed and properly developed. Good results should not be expected from contrasty negatives, nor from those which are flat. For best results, the composition should be simple and not too involved, particularly for the small prints rather than the large.

Exposure: I have come to the conclusion that my best gum printing has been done in sunlight that was not too hot. I believe the hot sun of Summer has an adverse effect on the coated paper. As an example, using either formula given herewith, printing through a good average negative in the sunlight in December, say from ten o'clock to two, for six minutes gave a perfect print. Printing in Summer sunlight would be shorter. The worker should make several experimental printings, closely observing the relation between the printing time and the result obtained by development. My advice in printing is not to attempt to judge the undeveloped print by its appearance. It is much better to select three negatives of different density, make perfect prints from each by direct sunlight, draw up a little schedule showing the printing time required by each class, then classify other

A HAZY AFTERNOON. A. C. G. Allison.

negatives by comparison with the negatives of known printing time. Another method, if one keeps data regarding all negatives, is to use an exposure meter with sensitized paper.

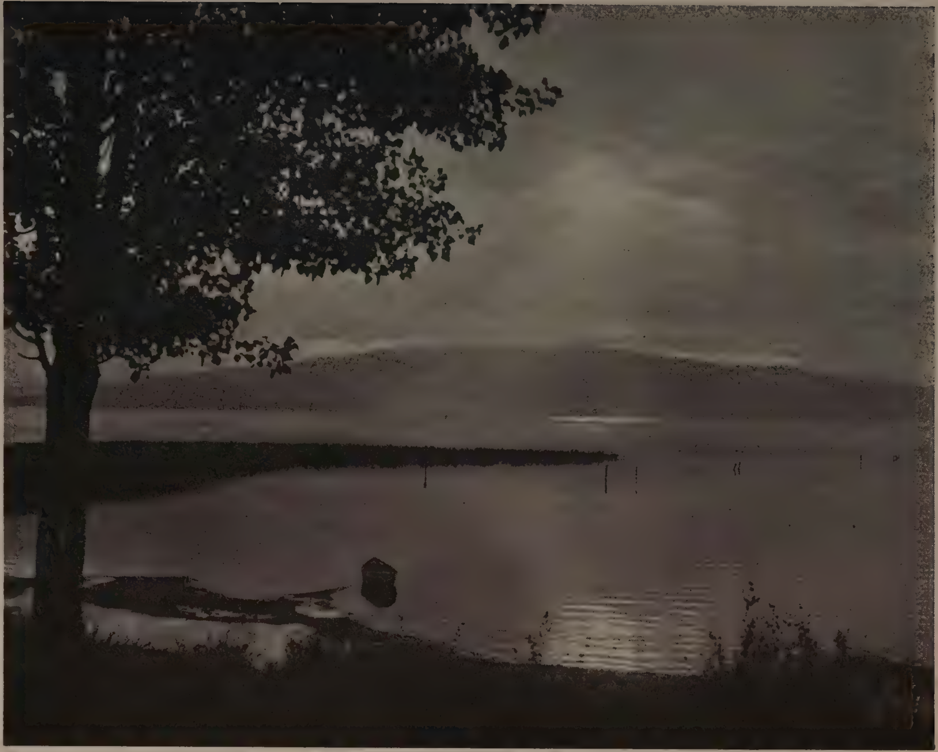
Development: Fill a tray with cold water and push print under water face up. Then turn print face down. Bubbles should not be allowed to form on face of print. Allow print to float on surface of water for twenty minutes. Print should be examined frequently. If exposure has been correct, it should now be possible to hold print up by one corner without any running of color. Printing time should be such that it is now possible, after this twenty-minute soaking, to hold print under water and with the aid of a small camel's hair brush gently assist the surplus pigment from those spots representing the high lights, and where greater delicacy is desired in the more distant planes. Should more pronounced high lights be desired, then use the small stiff ox hair brush. It will be found after a little experience that after a brief soaking the print may be slightly sprayed on those sections where it is desired to obtain a higher key. As the masked portion of the print will be found to dissolve off perfectly clean within a few minutes, the print should then be removed to a tray containing clean water and allowed to complete development therein. Care should be exercised in handling the print at this time as it is now in its most delicate state. Development being completed, print may be hung up by one corner to dry. It is important at first not to attempt developing more than one print at a time.

Clearing: A certain amount of bichromate remains in the developed print. This should be removed by placing the dry print in a bath containing two per cent of sodium bisulphite. Action takes place very quickly, within one to two minutes at the most being all that is necessary to remove the bichromate. As the bisulphite acts as a reducer, when color has changed, print should be immediately rinsed in clear water for two minutes, after which it may be hung up to dry.

Multiple Prints: Single prints tend to give delicacy, while multiple printings build up, strengthen, add richness of tone and tend to increase the scale. If it is desired to attempt multiple printing, the two formulæ already given may be diluted by adding additional bichromate equal to about one-half the quantity given. The printing time would be somewhat shorter. After first printing has been made, developed and dried, it will be found that the result is much flatter than when making single prints. Now, take this dry print and re-coat with the dilute mixture, print and develop. It will be noted print is gaining in strength and richness. A third or fourth printing may be made if desired, but generally on small prints a second should be all that is necessary, while three and four printings may be made in the large sizes to advantage. Naturally, prints should be carefully registered when making additional printings, otherwise result will be ruined.

A LITTLE OLD HOUSE BY THE WAYSIDE.

Illustrating article "Miniature Prints By The Gum-Bichromate Process," by William Gordon Shields.



UTAH LAKE. GEORGE L. BEAM.

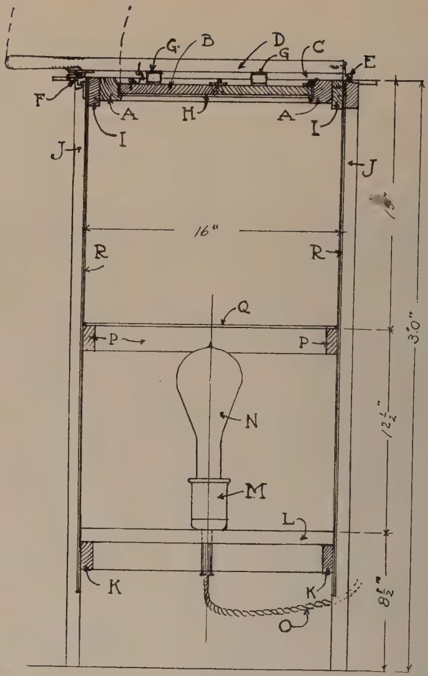


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Figure 2.
Illustrating article "A Home Made Printer," by Edwin B. Collins.

A HOME MADE PRINTER

By EDWIN B. COLLINS

THIS device was built around a 10 x 12 printing frame, 1 in. by 2 in., wood strips and beaver-board being the principal materials used. It requires no expert electrical work, stands on its own feet, and has shelf room for negative boxes, etc., at the ends.

Figure 1 is a general view showing electric connections. The light is operated by the key socket switch at the left. While not so rapid as an automatic connection it gives better control.

Masks, negatives and print paper are registered by working always into the same corner of the printing frame. Various degrees of diffusion are obtained by placing one or more thick-

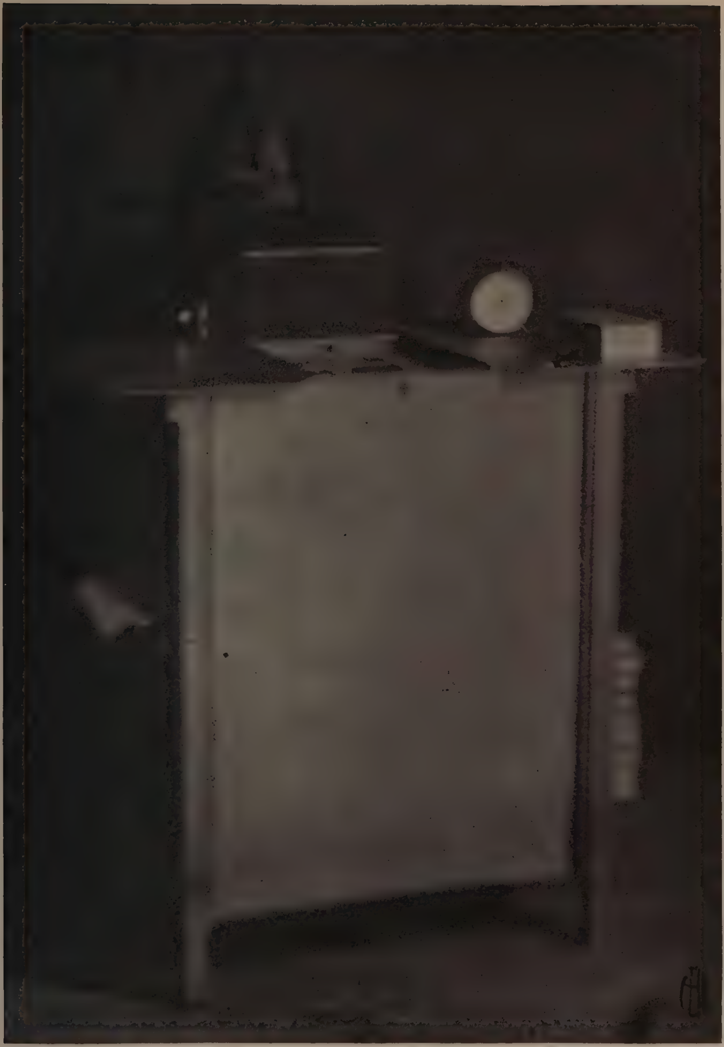


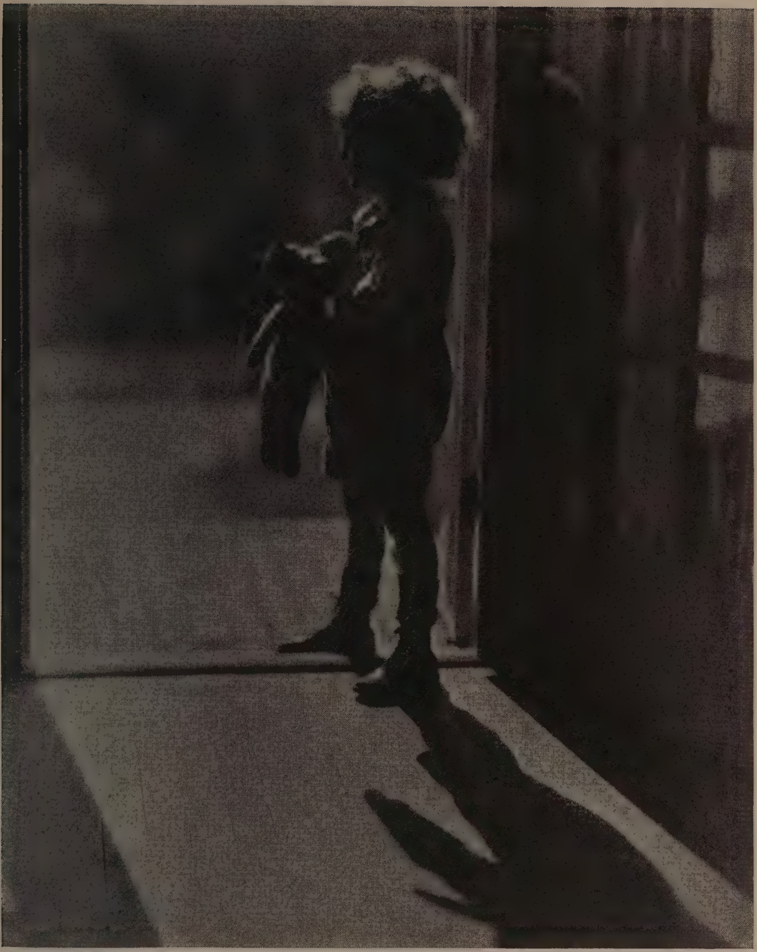
Figure 1.

Illustrating article "A Home Made Printer," by Edwin B. Collins.

nesses of glass, or sheet celluloid, between mask and negative. The single light is far enough away to give fairly even illumination for negatives up to 6½ x 8½. For larger sizes the diffusing screen should be used.

Figure 2 is a sectional diagram showing construction. A being the printing frame, B the back, which is hinged to the frame at C. D shows the operating lever which is hinged to the rear upper frame work at E, and locked in printing position by the cupboard catch F. The springs G are removed from the back and fastened to the operating lever. H is always one thickness of glass and sometimes more, with sheet celluloid as required. The top pieces I are 28″ long and are screwed to the printing frame. The legs J are nailed outside the top and bottom braces I and K. A cross brace at the center L carries the "mogul" socket M for the 300 watt Mazda lamp N. The lamp cord O connects by means of an ordinary extension plug with the key socket switch and upper lamp cord as shown in Figure 1.

The intermediate braces P are similar to those at top and bottom. They form a ledge to carry the diffusing screen Q which has a cardboard border and several thicknesses of tissue paper as required. R shows the beaver-board sheathing. The ends are put in on a line with the sides of the printing frame. This encloses the light chamber, and leaves space at each end for shelves about 7″ wide.



WOOTEN-MOULTON STUDIO.

BREAKING THE LAW

By EDWARD W. DONALDSON

PHOTOGRAPHY—speaking of it as the artistic medium—is governed by a number of fundamental rules which are almost inflexible in their application. In its wider aspects there are rules which are understood rather than written, and these may be interpreted almost at the will and according to the nature of the artist. It is in this sphere that the individuality of the worker appears, and the picture is either made great, or commonplace, according to the man behind the camera.

At times the breaking of these more lenient laws, which might well be called secondary, may be used to produce a picture of merit. But, as the breaking of any law is a serious procedure, the true artist will evidence himself by his judicious handiwork in the infraction. The customary balance of grouping, lighting, arrangement of background and masses are varied at the will of the worker and, while he has great latitude for the expression of his visions, nevertheless he is limited by certain arbitrary rules. These rules, both stated and implied, have grown into custom, and are the normal standard for the expression of symmetry and beauty.

Any picture which has for its background a hideous diagram of triangles, odd shaped forms of light and shadow or jagged edged masses is a deliberate contradiction of accepted standards. Rather than condemn it because of this violation, or *per se,* there is no doubt but that there is something in it which satisfies the eye and appeals to the senses in a rather unexplainable way providing it has been expertly handled. In writing of these "modern conceptions," the editor of a reputable art journal says that such a piece is often justified in that it is the interpretation of an idea and is therefore art. Its existence is further tolerated from the fact that it may contain the germ of a new idea. But there seems to be a more reasonable explanation.

The eye constantly seeks for rest and unconsciously turns

IN NATURE'S GARDEN. Louis Fleckenstein.

to the opposite. From the beautiful it seeks the unsightly if for no other reason than it might again enjoy the beautiful more fully. This trait has been realized in pictures, and is in evidence in the work of the old masters: the dance of the nymphs to the pipes of Pan where the eye turns from the beautiful figures of the dancers, and satisfies its natural longing for contrast with the sigh of the grotesque piper.

There is danger in going too far—in overbreaking the law. The eye needs but a slight rest; a moment's glance at the opposite and then a return to the normal. There has been a tendency toward too much radicalism recently, especially in a number of publications catering to the bizarre, new cults and futurist renderings. The law of contrast which makes ugliness almost a thing to be admired, until it is misused, has been more than broken; it has been assassinated. One success is deemed sufficient cause for a deluge. As a result, the art critical public have their senses dazed and their eyes tormented by an interminable series of jagged backgrounds, ghastly lighting and contortionistic posing. When ugliness, playing a poor masquerade under the title of "Art" greets the eye from every page, contrast has been reversed and beauty is the thing we long for. It is a restful experience to again view a conventional picture.

From this experience it would seem that the wise operator would approach any tempting radicalism in his art with due caution and judgment. In a recent publication appeared a picture which was undeniably a "law breaker." The lighting was harsh, the pose stiff and the ensemble broken into irregular masses. Yet one looked at it and was pleased for there had been skill in its misarrangement. Another picture, the figure of a richly gowned woman, posed at one side of the frame with the train of the gown providing the only detail for the other side failed in its attempt at originality. One could see the studied effect, it was simply "bizarre."

The worker who turns out pictorial nightmares, trusting to the credulity of his critics for his success, is nothing but a law breaker and his success, while pyrotechnical, will be short lived. The man who breaks the law, but who does it discriminately and intelligently—is an artist.

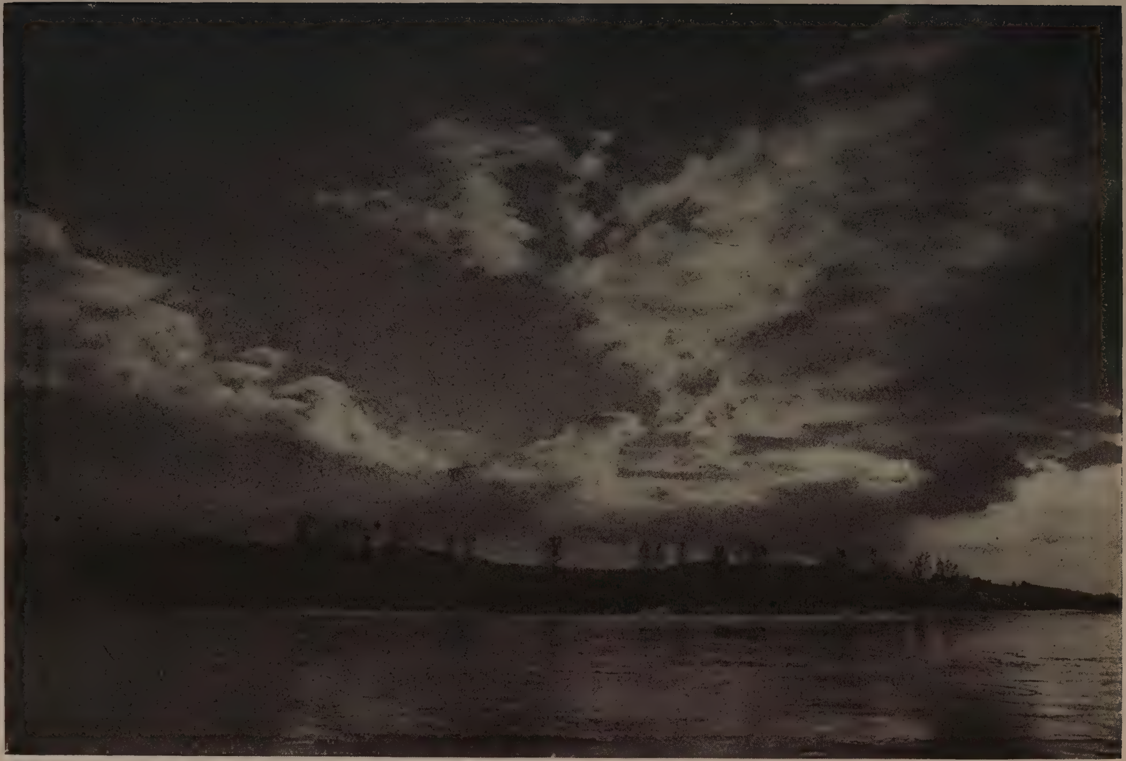
THE SKY AND THE PICTURE

By HORACE SYKES

"THE sky and the picture," I mean the relative importance of the sky in a picture that can lay claim to some measure of artistic quality. In order that you may realize this I am going to ask you to select a few landscapes that appeal to you and analyze them. You may argue that in the painting it is the coloring that gives the quality, and the photographic print in monochrome can not be so greatly benefitted by the treatment of sky, that in photography it is not worth while to study and work for sky effects. It is on this point I wish to dwell, because the landscape painter has so long made use of striking, or characteristic, skies to bring out the desired expression, that the real value of the sky in the picture needs no argument. To show the value of the expression of the sky in a photograph, and how much it means to the artistic quality, is the purpose of this article.

The sky is the crowning glory of the landscape, it is always the thing above. It is an ethereal blanket of beauty and wonder that eternally overspreads the fixed and commonplace objects of the earth. It is everchanging, fascinating, and inspiring. Man has forever raised his eyes to it for relief, uplift, and encouragement. If in the glaring noonday, the gray misty morning, the golden hours of sunset, or the star studded depths of night, or if it is raging with the fury of storm, enchanted with majestic masses of summer clouds, sprinkled with the feathery forms of cirrus or nimbus, or only a vault of unending azure, there is something in its unexplored depths that the human soul goes out to, something that irresistibly draws, and the eyes and intellect are constantly turning to it.

The old mariner looks to it at evening to know what the morrow will be. The sourcerer looks to it in order to fore-tell the future. The faithful raise their eyes to it in supplication. The wise men saw in its vaulted eastern depth the emblazoned signal. Men will forever crawl and move about under its



Illustrating article "The Sky And The Picture," by Horace Sykes.

dome of infinite wonder, glory, beauty, and mystery, look to it in pleasure, hope, joy, and in despair, and close their eyes the last time with gaze directed into its depths. Is there a wonder that the sky is the ultimate, the crowning, the finishing stroke, the master note that completes the chord of nature?

Make pictures not alone of the substance of the earth and the common forms about you, but rather use those for a base upon which to build, a pedestal upon which to place the real picture. Remember white paper tells but little, and look to sky for means of the highest expression.

In the faithful rendering of sky, and its relationship to earth and foreground, photography as a medium, if it is properly used, offers advantages worthy of consideration. The drawing of the lens is correct; the tonal values can be faithfully reproduced; and the impression can be made in a short interval of time, the supreme moment when nature presents the scene at its best, and all the grace and witchery that enchanted you, that caused you to see the picture, to stop study and select the view point from which it most appealed to you, can be caught in the silver snare of your dry plate, and made to live in your print.

After all, as I see it art lies more in selection from nature, and the arrangement of subject matter with relation to the four sides of the frame, than to any inventive genius that attempts to re-arrange the natural and improve on the work of the great artist of the universe, who arranged them for us in the first place.

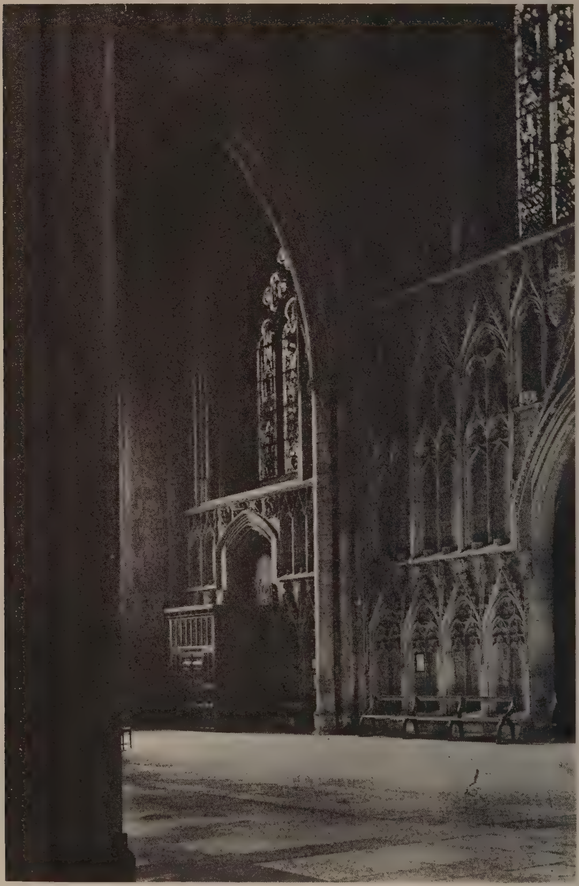
Nature gives the highest expression of art and our accomplishment lies in being able to recognize, comprehend and appreciate that expression. The medium whether camera, brush or pen, is only the vehicle by means of which we are able to convey our comprehension of that expression to our fellow man.

Do not be spare in the use of your camera. Bountiful nature is arranging before you an everchanging panorama, and invites you to select at will of the rarest, while ever and anon above it is that marvelous, more than world, old-sky.

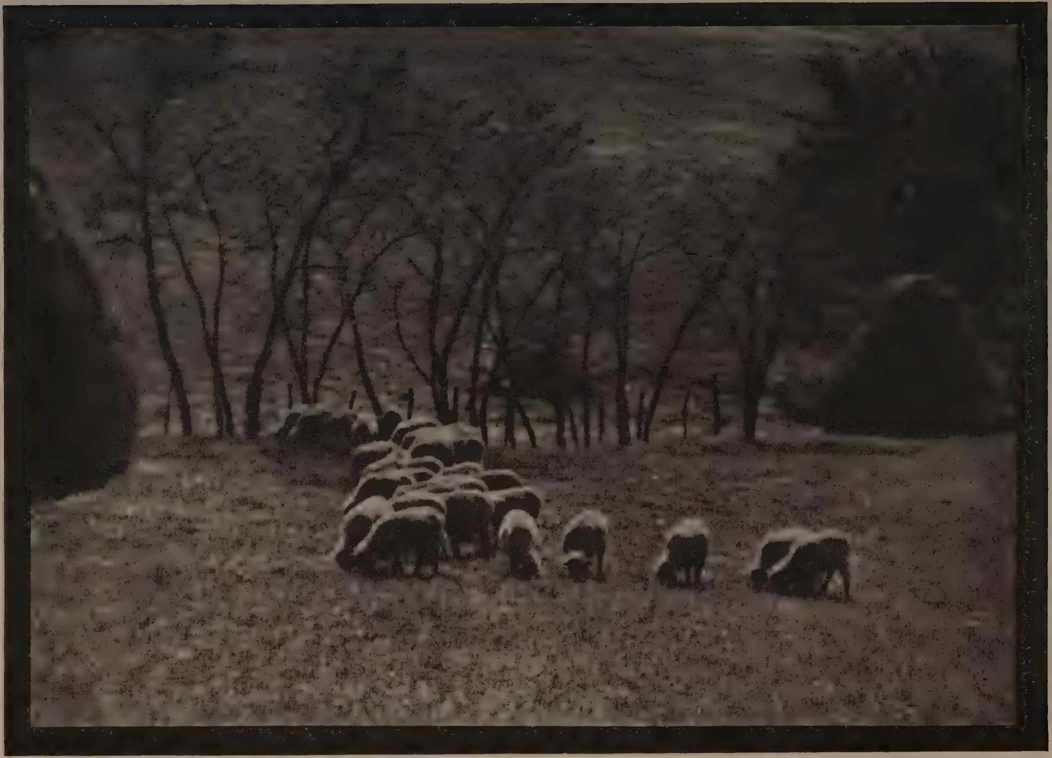
MEDITATION. ELEANOR L. SMITH.

It has never appeared to you the same as you now see it, and never will appear the same again, and with your trusty camera you can perpetuate the enchanting expression or mood of the elements, which if missed is lost.

Let me appeal to you, do not continue to make pictures of only rocks, trees, and brooks, but include nature and her wonderful skies.



A CORNER OF YORKMINSTER. J. E. ADNAMS.



IN PASTURE. LAWRENCE BAKER.

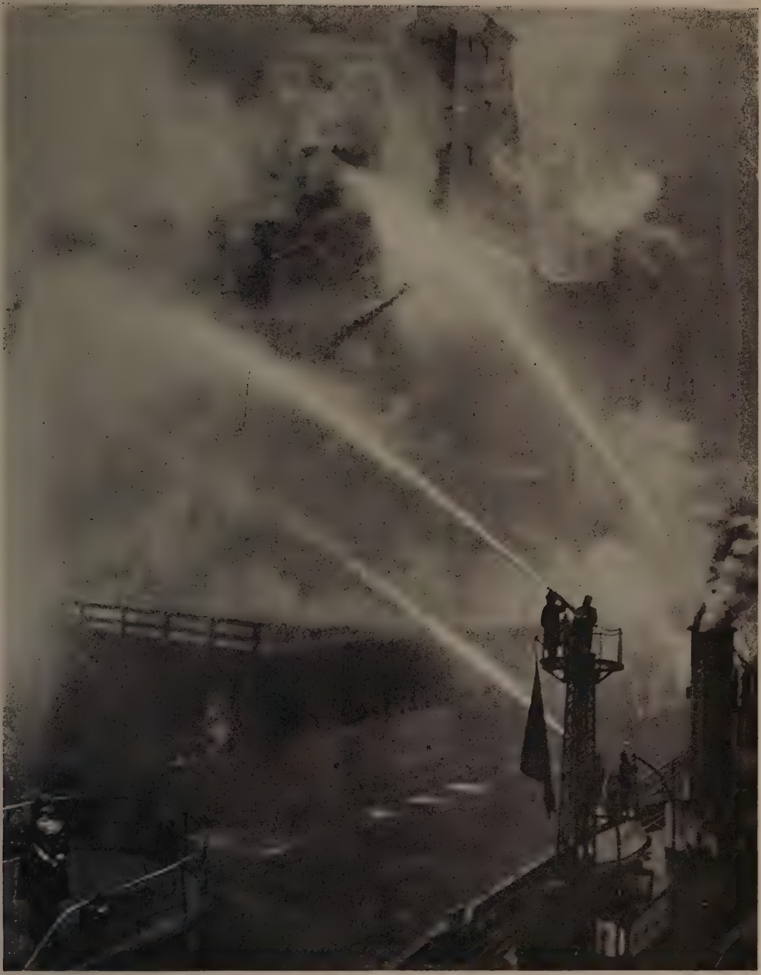
CHAS. W. DOUTT.

PHOTOGRAPHING FIRES

By WILLIAM H. ZERBE

WHAT is there about fires that show smoke and flame that is so fascinating? When we hear the clang of the fire engine, or the steam whistle of the steamer, we at once step to the curb and watch the fire apparatus go by and feel the urge to follow. If we see signs of smoke we are tempted to follow and watch the fire laddies at work, risking their lives to save the burning property and perhaps human lives.

In my work as a news photographer, I have had the opportunity to attend a great many conflagrations, and although I am getting used to them, they still hold a strong fascination for me. When picturing these my first consideration is to portray the news angle of it, and in doing this it may be necessary to get inside of a danger line. One may have to



SMOKE AND FLAME.

Illustrating article "Photographing Fires," by William H. Zerbe.

climb to an adjoining roof, mount a water tank, or even work along side of the firemen at close range to the flames. The news photographer must take many risks if he wishes to get something spectacular. He forgets his own danger in his enthusiasm to accomplish this. Perhaps the most spectacular pictures are those showing the apparatus in the street with the maze of hose, and the men below the building, or on ladders, directing steams of water.

When assigned to fires, besides playing up the news features I have always in mind the pictorial possibilities. Flame alone does not photograph well. It is well to watch when a draught starts the smoke curling out of windows, or from the roof. If one can get a steamer in the foreground with black smoke belching from its funnel, and firemen beyond directing a stream of water into the blaze, then one can always be sure of securing an effective picture. Sometimes the smoke is so thick it is hard to see anything at a little distance. This condition very often lends itself to very pictorial results.

In the larger cities now one rarely sees a fire gain much headway. There are many reasons for this, such as fire-prevention laws, fireproof building and furnishings, motorized apparatus which bring the firemen on the scene in a very short time, and lastly, a high pressure water service.

The average amateur will not be able to get to the most advantageous point to make his pictures owing to the police lines which are established almost as quick as the firemen arrive. This is a great advantage to the news-photographer who has his credentials which allow him to go most anywhere that the Chief does not think too dangerous.

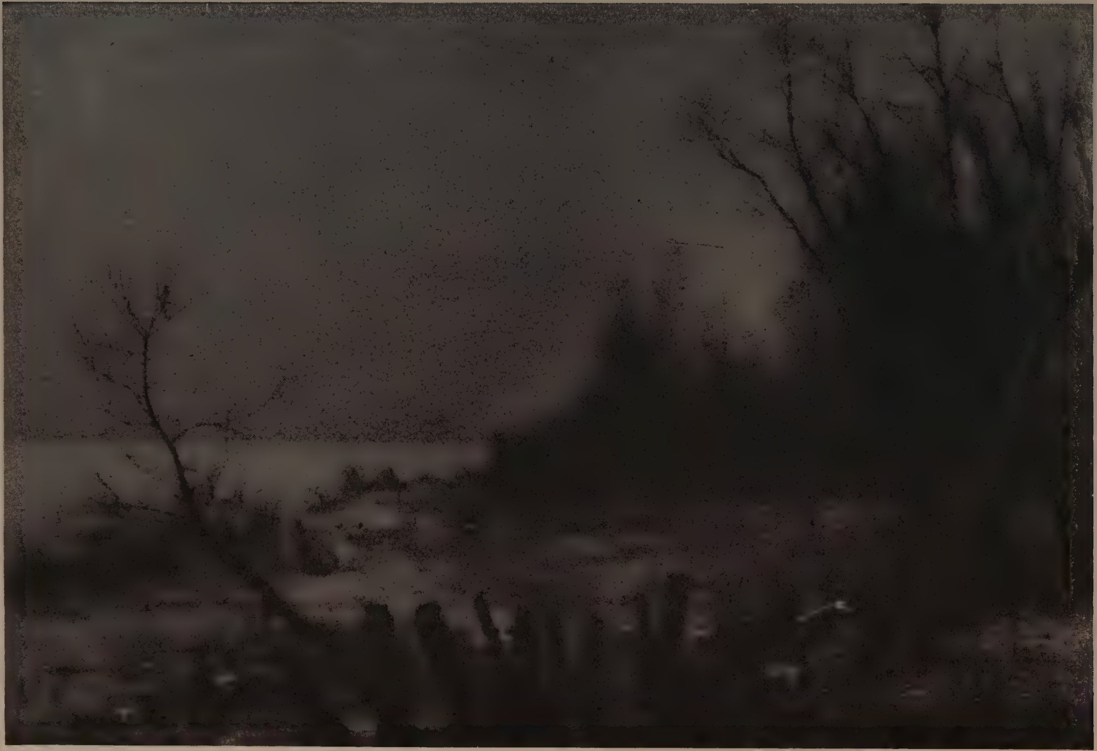
To one making fire scenes for the first time their negatives may seem disappointing. One is apt to look for a crisp brilliant negative. This may be the case if there is a strong wind blowing the smoke skyward. Generally the air is very heavy, especially if many streams of water are being turned into the fire, in which case the smoke will hang low, enveloping the entire neighborhood. When such a condition exists, there are usually good opportunities for pictorial results, but a poor

SMOKE EATERS.

Illustrating article "Photographing Fires," by William H. Zerbe.

chance for a news picture. At fires opportunities for either news pictures, or pictorial effects, last only for a moment. the camera man must be on the alert to capture them. A knowledge of composition will be a great aid in getting the best arrangement.

AT THE COLUMNS. PETER G. PETRIDIS.



A WINTER MORN.

EUGENE A. DELCROIX.

WIND BLOWN TREES. J. HAROLD LEIGHTON.

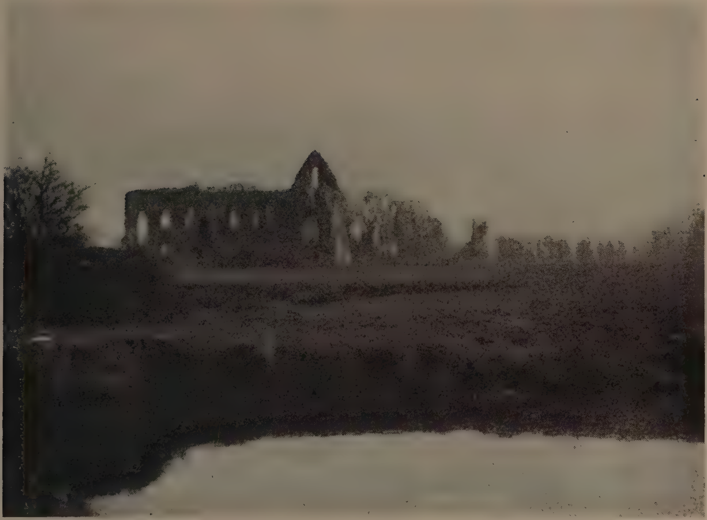
MODIFYING THE PICTURE

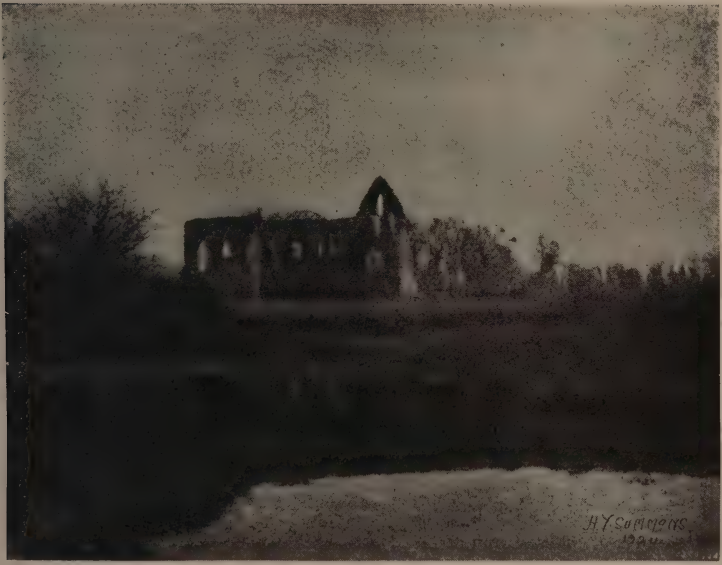
By H. Y. SUMMONS

THIS method of manipulation is not intended for the man who is content with a photograph that is a mere record and nothing more, but for he who wants to get something more—not materially but artistically more—than his original negative is prepared to yield—that elusive "feeling" that makes the success of a picture, the effect one sees but which the lens often fails to register.

My method is to recover that lost soul, and is now being presented to the readers of the *Annual* as a method of artistic expression more than as a manipulative agent for the conversion of a landscape into a portrait, or a portrait into a seaview, though these alterations could be accomplished—with the necessary ability to do so.

We have long been accustomed to the use of enlarged paper negatives, and though they have many advantages, and few disadvantages, they are still used far less frequently than one would expect, while the same material employed for the intermediate stage as a transparency is practically unheard of.





NEWARK ABBEY.

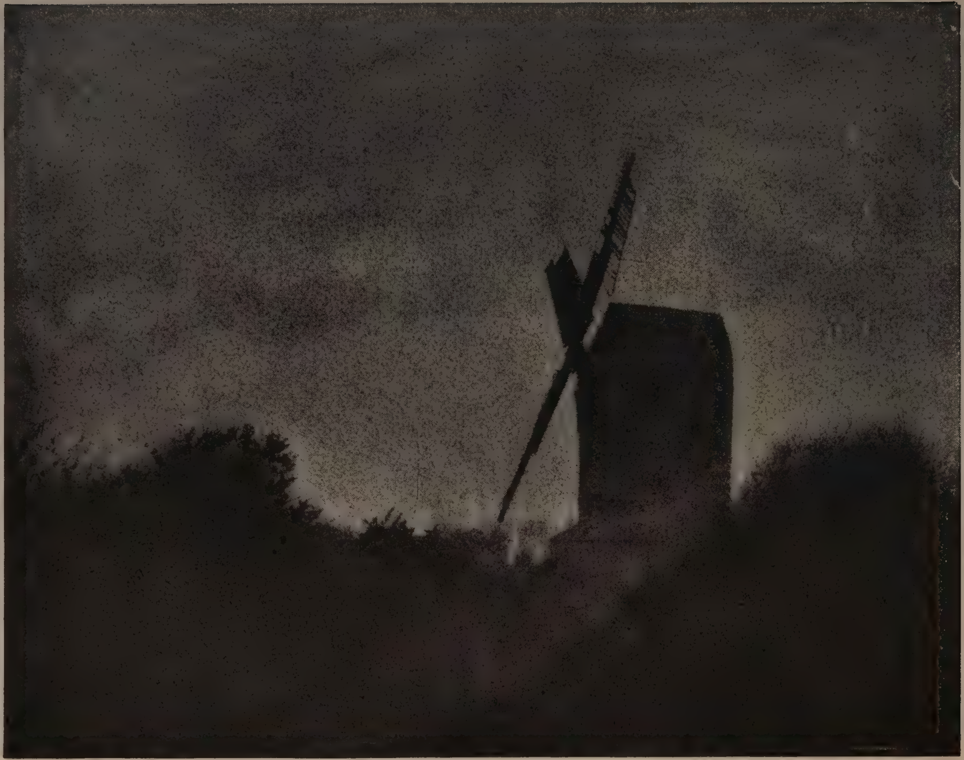
Illustrating article "Modifying The Picture," by H. Y. Summons.

To suggest it savours of rank lunacy and invites immediate condemnation. Still it can be employed to give anything from the beautiful texture of a fine mezzotint to the sketchy effect of a rough charcoal drawing, and this simply by varying the form of paper used; a few experiments with bromide and gaslight papers of different thicknesses and surfaces giving the necessary working knowledge.

Unlike a transparency made upon a glass plate, which must be thin with delicate tone gradations, that upon paper must have a decided strength. To obtain this the original negative is put into the lantern and enlarged on to bromide paper to the size of the finished picture, a generous exposure and full development following. This gives a print far darker in appearance than one to be used as a finished picture. When dry this can be used either for making the new negative by contact printing, or it can be waxed to make it more translucent, and worked up on either or both sides with pencil or crayon and stump to tone down high lights, increase shadow depths, or effect any other changes.

For the final negative the same (or another) variety of bromide paper is exposed in contact with the transparency and developed to give a density suitable for the process to be employed in the picture printing; or, if the transparency is inclined to be weak, a gaslight paper may be used. This in turn can be worked up to produce high lights to increase the luminosity of shadows or otherwise to modify the tones, or it may be waxed to increase translucency.

The whole of the process may be carried out on the emulsion side, or the printing may be through either or both of the papers, so that endless variations may be achieved in the final picture to suit any temperament, but, whatever is done, one fact may be relied upon—the result gives something to the finished picture (for it will be a picture made photographically more than a photograph made pictorially) that has more soul or atmosphere than one made by direct enlargement. Moreover, duplicates are so readily made that the time and trouble compensates for the extra labor spent in making the new negative.



SLEEPING MILL. H. Y. SUMMONS.

COLD WEATHER PHOTOGRAPHY

By A. W. DREYER

THE man who uses his camera only on fair days of Spring and Summer does not know what he deprives himself of by not using it the other part of the year. Blustery cold winter offers many choice opportunities for out of the ordinary pictures. I do not refer to the usual line of winter pictures, snow bedecked parks, and frost-covered statuary.

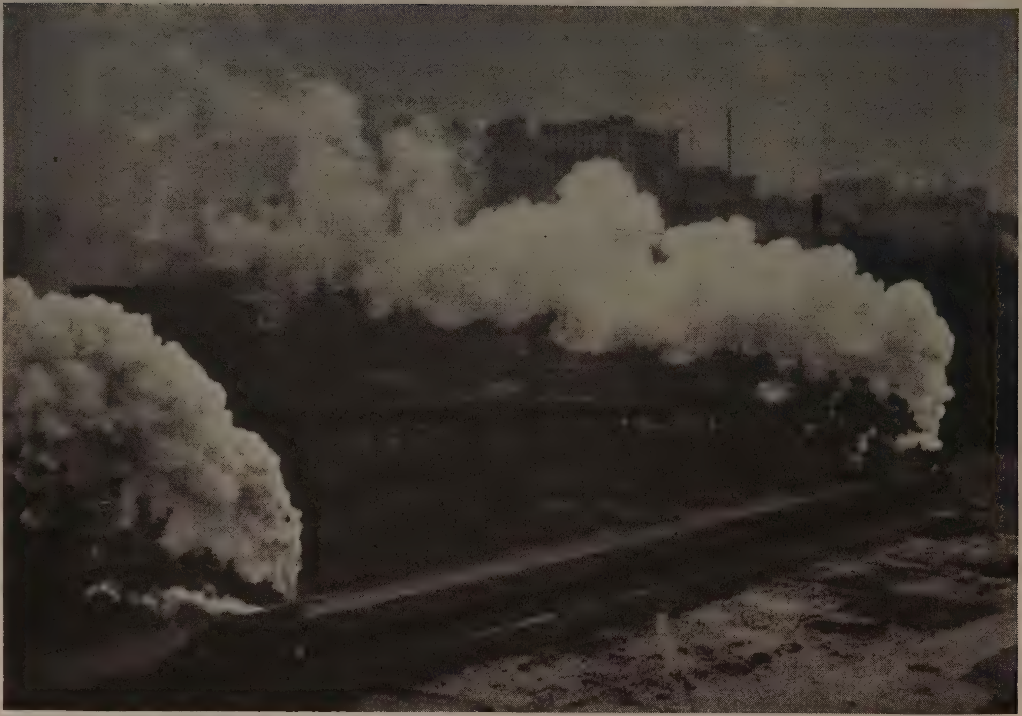
Excellent as these are, there is yet another field for the enterprising photographer in search of artistic material for the camera. If he will but wend his way to the railroad yards, and has an observing eye, he will find that the hand of Winter has transformed an otherwise smoky and uninteresting place into one of extraordinary photographic possibilities.

Instead of the usual smoke issuing from the locomotive as in Summer, we now see in its stead, a magnificent plume of steam, hundreds of feet long and reaching high into the air, before it fades away. Naturally the steam issues just as surely in warm weather, but then it is almost wholly invisible, and we see only the smoke.

It is the cold atmosphere that makes visible the steam by converting it at once into watervapor.

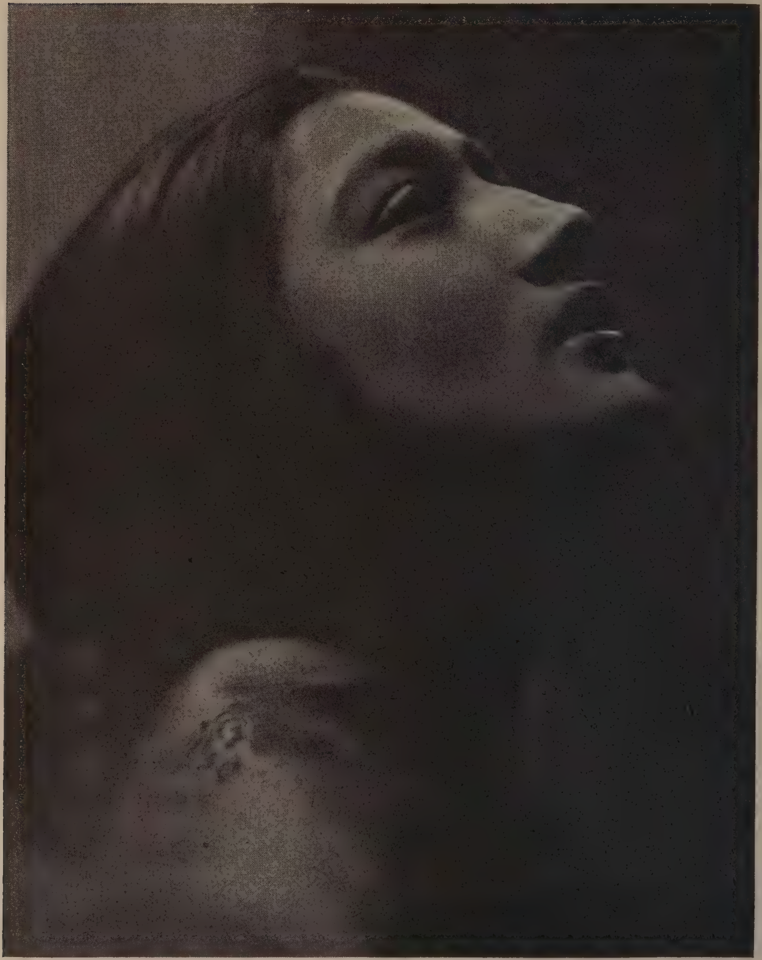
Do not try to photograph trains running at high speed, as this requires a very short exposure, and the light of the winter months will not permit of same. The best pictures are those obtained of slow moving, heavily loaded freight trains, or one laboriously climbing a grade. Such an engine will belch forth immense columns of steam. As the vapor ascends upward, it will continuously grow and unfold itself in everchanging curves, looking very much like a cumulus cloud.

It is somewhat difficult to judge the light accurately in the dark days of winter. It is, therefore, advisable to use an exposure meter of some kind. Almost any kind will do. Cold weather will hold no terrors for him who has become acquainted with this form of photography. He will find instead

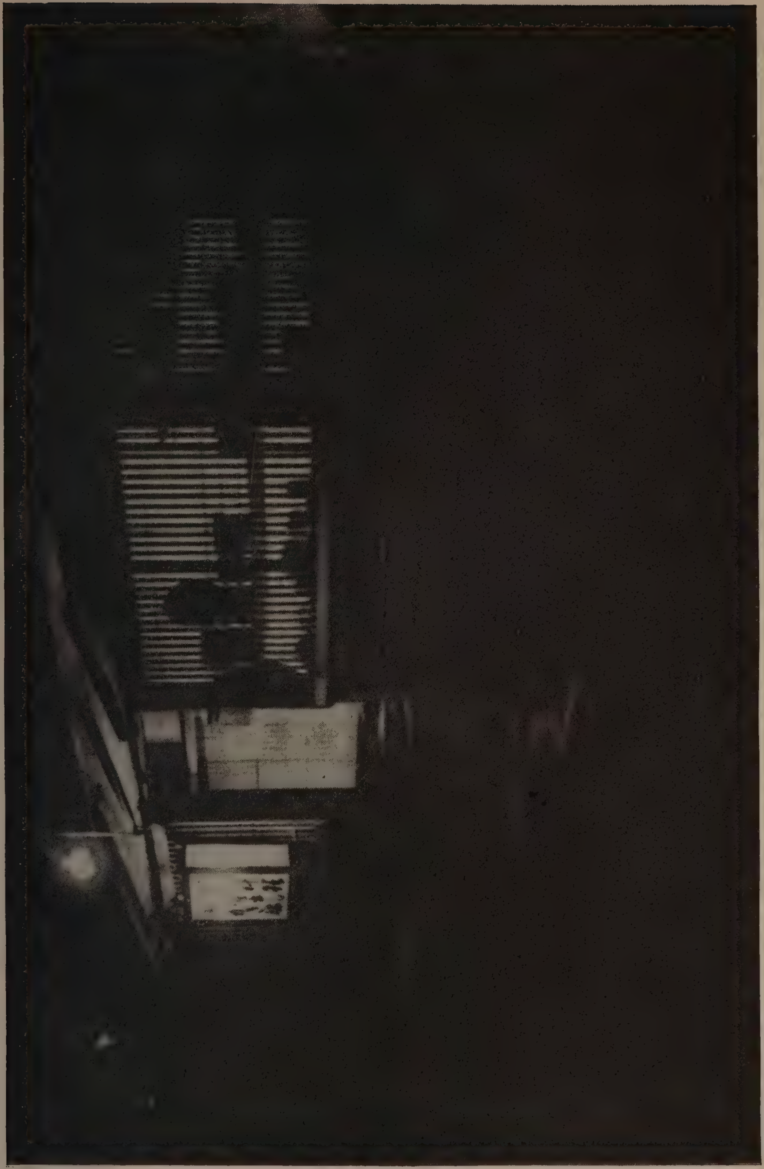


Illustrating article "Cold Weather Photography," by A. W. Dreyer.

that Winter has departed all too quickly, leaving him waiting eagerly for the return of the next cold season. The photograph accompanying this article (Figure 1) was made in January about 3 o'clock at F6/8—1/20 second.



OLGA BARABINI. NICHOLAS HA'Z.



RESTAURANT—NIGHT SCENE.

Y. OHKURA.

SAVING FOGGY PAPER

By E. K. EMSLIE

DEVELOPING papers that show fog due to age may often be saved by proper development, or by printing somewhat darker than required and clearing with Iodine bleach.

The most desirable method is the first, as it saves several operations and considerable time and the quality of the print is better. Amidol or Acrol is a developer that I have found to give very satisfactory results. The formula is from the *British Journal Almanac* and is as follows:

Neutral Stock Sulphite

Sodium sulphite dry	2 oz.
Sodium bisulphite dry	½ oz.
Water to make	20 oz.

Boil this solution a few minutes and when cool take

Neutral Stock Sulphite	4 oz.
Amidol (or Acrol)	50 grains
Water	16 oz.

To this add enough potassium bromide, saturated solution, to keep white margins or high lights clear. More will be required for old or foggy paper than for new paper. More bromide can be used with Amidol than with some other developers and not produce unpleasant color. The printing time should be increased when more bromide is used.

The Neutral Stock Sulphite keeps well, and the developer when ready for use also keeps. I have developed more than one hundred 8 x 10 prints in a single batch of eighty ounces of developer. As a trial, after developing forty-two 14 x 18 bromide enlargements of maps in a batch, the solution was left in an uncovered tray from Wednesday to Friday when a print on Azo was developed in it. The print was not discolored, but was softer and required a longer exposure than usual.

Different brands and different lots of the same brand, when old, react differently to Amidol. Bromide papers have not given as good results as the slower varieties.

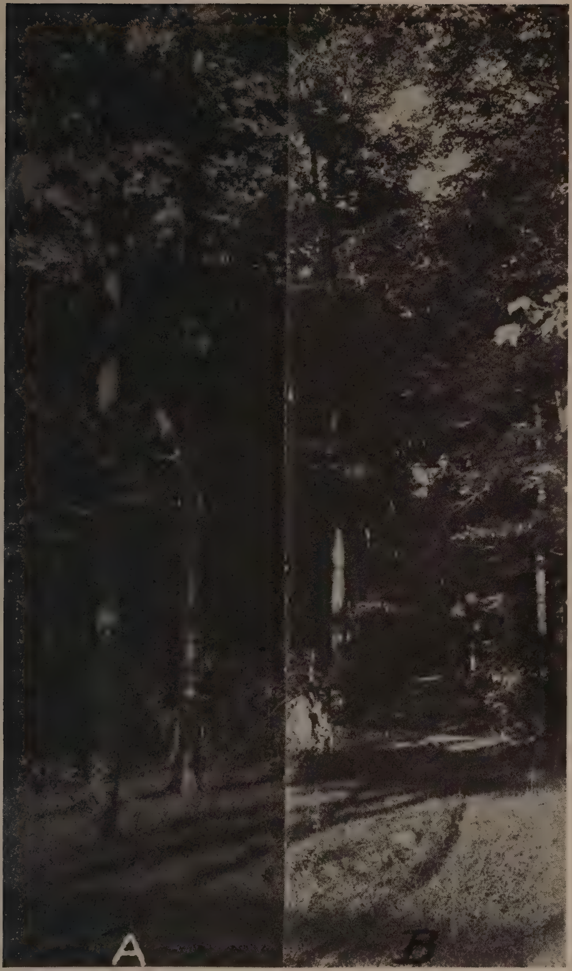
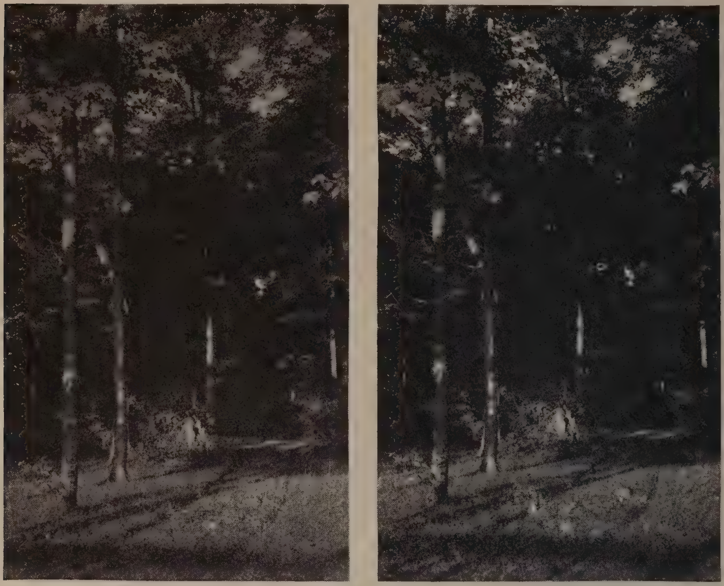


Figure 2.

A. UNBLEACHED HALF OF PRINT.
B. THE OTHER HALF AFTER BLEACHING WITH IODINE.

Illustrating article "Saving Foggy Paper," by E. K. Emslie.

When exposure and bromide are increased, the prints do not yield satisfactory sepias, the tones being weak. Figure 1 shows a comparison between Elon-Hydroquinone developer and Acrol. The expiration date on the package was February 1, 1917. "A" was developed in Elon-Hydroquinone developer October 18, 1922. "B" was developed in Acrol June 5, 1924. Note the difference in the margins and in the lighter parts.



A B

Figure 1.

Expiration date of paper Feb. 1, 1917. A. Developed in Elon-Hydrochinone Oct. 18, 1922. B. Developed in Acrol June 5, 1924.

The Iodine Bleach

If old paper that is not too foggy is printed slightly darker, the fog may be removed, after thorough washing, by using the iodine bleach.

Make a solution of potassium iodide 500 grains, water 4 ounces. When dissolved add iodine crystals 500 grains, which will dissolve rapidly. Add water to make five ounces.

This solution is poisonous and corrosive and should not be allowed to come in contact with the skin. The iodine crystals will cause burns to the skin, also.

CHARLES A. WAGNER. NICHOLAS HA'Z.

To use, take ½ dram of stock solution to each quart of water. Quickly immerse the print, wet or dry, until fog disappears or print is light enough. A few trials will give the proper appearance. Usually by the time the high lights have turned blue, reduction is completed. The solution may be used stronger, but will require close attention and quick action when the print is light enough. After bleaching rinse and fix in an acid hypo fixing bath, the same as for the original print. The paper will be stained a dark blue, but this color disappears in the hypo. If the paper does not turn blue on the back rapidly, the bleach was not made strong enough, has become exhausted, or the print contains hypo.

This reducer works well with sepia prints. Abrasion marks are easily removed with the iodine reducer and in several instances, I have removed yellow stains from prints with it.

Figure 2 shows results. "A" is one half of the original print and "B" the other half after bleaching.

The iodine reducer increases contrast, and is especially good for clearing copies of charts or other line subjects.

THEODORE EITEL.

JOE'S CUSTOMERS. G. W. HARTING.

AN HISTORICAL FIND

By WM. H. BROADWELL

TAKE two stones the surfaces of which coincide, and place them one upon the other. Barring interference they will remain there countless ages, or until the rocks themselves disintegrate. That is why there are still observable in the woods between Morristown, and Basking Ridge, N. J., the remains of fireplaces built by Revolutionary soldiers to keep themselves warm during the bitter winter of 1779-80. They have weathered the storms and winds of a century and a half; some have been disturbed; others poorly erected, have fallen down of their own accord. But there is still one, at least, as perfect as the day it was built. A few stones around the top have been displaced by an occasional visitor who probably did not realize the significance of these stones, but with the major portion untouched by the hand of man since they were placed there by the benumbed fingers of an heroic soldiery.

To the photographer with a penchant for ferreting out historical places he must not eschew hard going in following up his hobby. Let one who would see for himself the signs left by Washington's army prepare himself as for a hunting trip, sans gun; in its place a camera (not an 8 x 10 like mine happened to be) and set forth, not for a few hours ramble, but to make a day of it. A five mile walk—unless you have a car—along a country road, a stretch through the woods crossing a brook and a long, steep climb around and up the mountain side. Coming to a heavy growth of timber you start hunting as you would for game. You will find the remains of sixty or more of these fireplaces where toes were warmed and meals cooked.

You must know what to look for because many of the fireplaces look only like heaps of stones. But examine them closely; remove the fallen leaves and you will find, invariably, a couple of anchor stones; again you will find the back of the fireplace and one side stone in place; in others, protected by a thin layer of leaves and earth you will find a little stone hearth with ashes still in it. All this is located on Tea Hill,

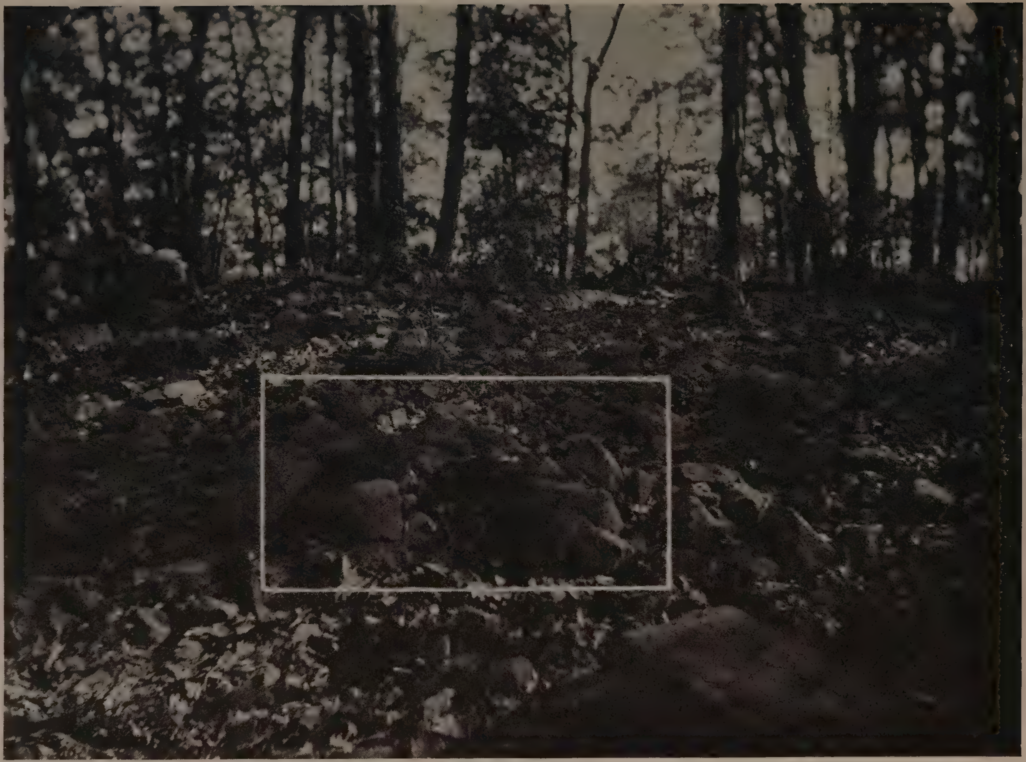


Figure 1.

SHOWING LARGE FIREPLACE ON TEA HILL; LARGE STONE IN BACK OF FIREPLACE.

Illustrating article "An Historical Find," by Wm. H. Broadwell.

so named from the fact that Peter Kemble used to have his tea served there, and from which a wonderful vista is unfolded.

To the north of this hill are two rows of locust trees. These are headstones, as this section was used for hospital purposes. The men who died in the hospital camp that winter were buried there, and the trees planted to protect them from the plow.

Much more could I tell you about this section, but it would not be purely photographic. Is it not worth while to have a hobby of this kind? What can be more fascinating than to discover such a place—a place few have seen or even know is in existence. How it starts one looking up his history, gathering facts to fit the pictures he has taken.

Figure I shows large fireplace on Tea Hill; large stone is back of fireplace.

Figure 2 is one of the sixty or more smaller fireplaces, as shown in white square. Shows how difficult it is to recognize fireplaces unless you know what to look for.

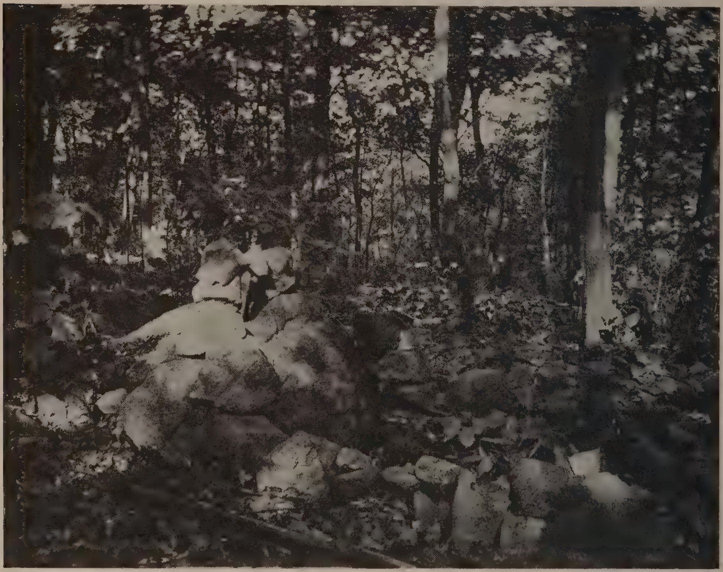


Figure 2.

ONE OF THE 60 OR MORE SMALLER FIREPLACES. SHOWS HOW DIFFICULT IT IS TO RECOGNIZE THE FIREPLACES.

Illustrating article "An Historical Find," by Wm. H. Broadwell.

SUNLIGHT AND SHADOW. C. H. SHIPMAN.

THE PSYCHOLOGY OF HOBBIES

By MILES J. BREUER, M.A., M.D., F.A.C.P.

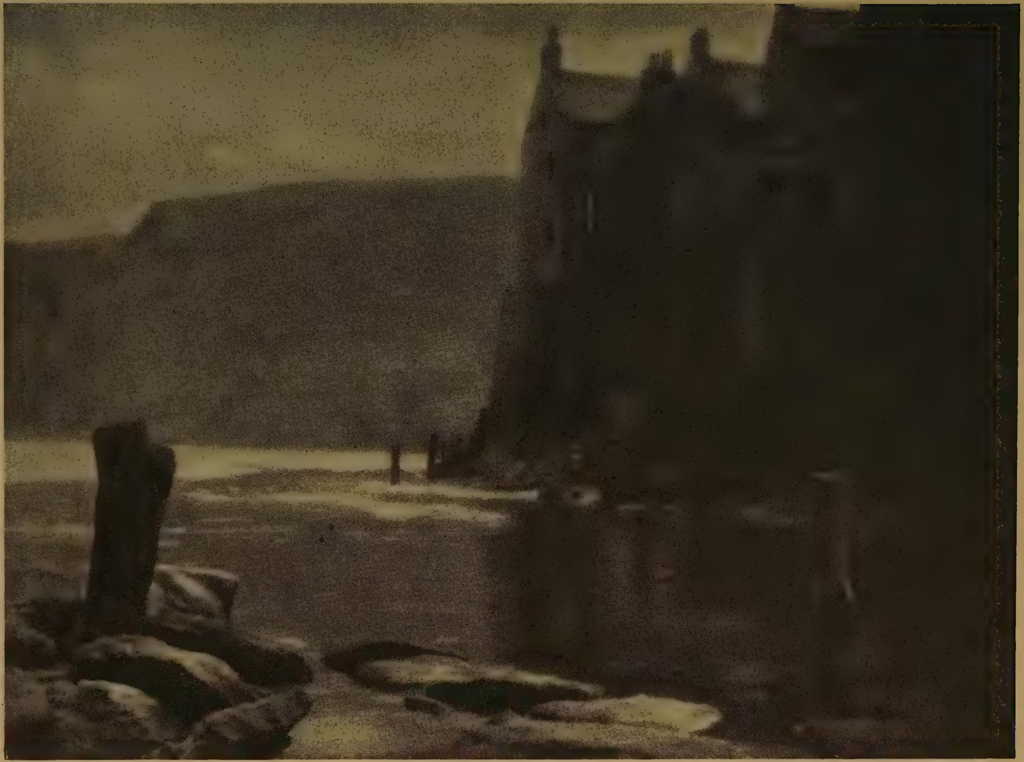
I.

WHY A HOBBY?

DO you have a wee small sort of guilty feeling sometimes when you consider how many hours you waste on photography, which you might be devoting to building up your business, earning more money for your family, accumulating a surplus for old age, and so forth? There must be a good reason for this hobby, or you would not persist at it, in spite of the protests of your wife and conscience.

There would not be nearly so many people in this world enthusiastically riding hobbies, if everyone fitted perfectly into the job at which he must make a living. The man who enjoys his vocation thoroughly and completely, has no time for an avocation. The man who has a leaning in his bones toward research, but must make his living selling insurance; the man who was born an artist, but is compelled to do time as a bookkeeper; the bank president who would rather work as his own gardener—these are the material that amateurs are made of. And, I do not know but what the amateurs have done the world about as much good at their hobbies, as the strictly "shop-minded" people have at their regular tasks. Some of the most noted original contributions to art, literature, and science, have been made by amateurs, whose regular business was something else.

There is a good deal of talk nowadays about vocational psychology, and about the study of accurate methods of fitting every man to the job for which he is suited, and which he can enjoy. I do not think that there is much danger that hobbies would disappear from the face of the earth, even though the vocational psychologists had full power and authority to carry out their very best work. Our modern world is too specialized. In the early days of man's development an individual could live a rich and many-sided existence. He was a fighter, farmer, mechanic, and a hunter. Ages and ages of that kind of a varied existence have developed in



AT STAITHES. J. Arthur Lomax, F.R.P.S.

the majority of mankind a desire, and a real need for variety, change, and multiplicity of interest. But the modern world takes a man and sticks him into a job which makes the same monotonous movement all day long, and every day in the year. Be he big or little among his fellow-men, in order to accomplish anything in life, yea, even in order to make a living, the average man is compelled to pick out one narrow, specialized thing, and do it well, which means doing it constantly and continuously. And that means tiresome monotony, and a cramping of human interests and desires.

Probably the farmer is the only man to-day, who can if he will, find in his vocation satisfaction for all the many phases of human impulse and desire. The farmer, if he must, can exist without a hobby more readily than the rest of us. In our age Benjamin Franklins or Ciceros are no longer possible. Both of these men were in their respective periods outstanding statesmen, writers, financiers, business men, and scientists; they were happy and famous in many lines of activity. The days are over when such a thing is possible. To attain excellence or prominence in any line of work, a man must to-day devote to it a lifetime of concentrated effort.

There are a few individuals in this world who can do that, who can run on a single rail, so to speak, and be happy at it. Their number is small, and they are not very popular among their immediate acquaintances; they may be geniuses or just nuts; they can live on one subject all their lives and never feel the lack of variety. But most of us need change and diversity of interest.

The average man's nature is many-sided. Long ages of evolution made him that way; or to say the same thing in other words, only the man who was versatile and adaptable was able to survive in the struggle for continued existence. Neither his mind nor his body are so made that they can concentrate for very long at a time. Only a variety of interests, giving him relief one from another, make life worth living for him. The man whose work is strenuous and outdoors all of the time, needs something close and confining to round out and balance his life; the man whose regular work consists of numerous interruptions and sudden calls, must find some quiet and consistent pursuit for his leisure time. And so on.

This need is not an imaginary one. It is physiological and concrete. Man has dominated the earth and all other living things, because his mind and body together have so passed through the ages that they are best able to adapt themselves to their environment, take advantage of it, and control it to suit their own needs. Our environment on this earth is a variable one, full of unexpected difficulties; and man's mind and body are highly developed to keep on top of this environment, trained by the difficulties they have encountered in the past. If mankind wants to stay on top, it will have to keep its mind and body in training. Unless we do this some other ambitious animal will get ahead of us some day. The birds and reptiles are admirably adapted to progress; it has often seemed strange to me that it was not the bird branch of creation that developed brains and forged up to leadership.

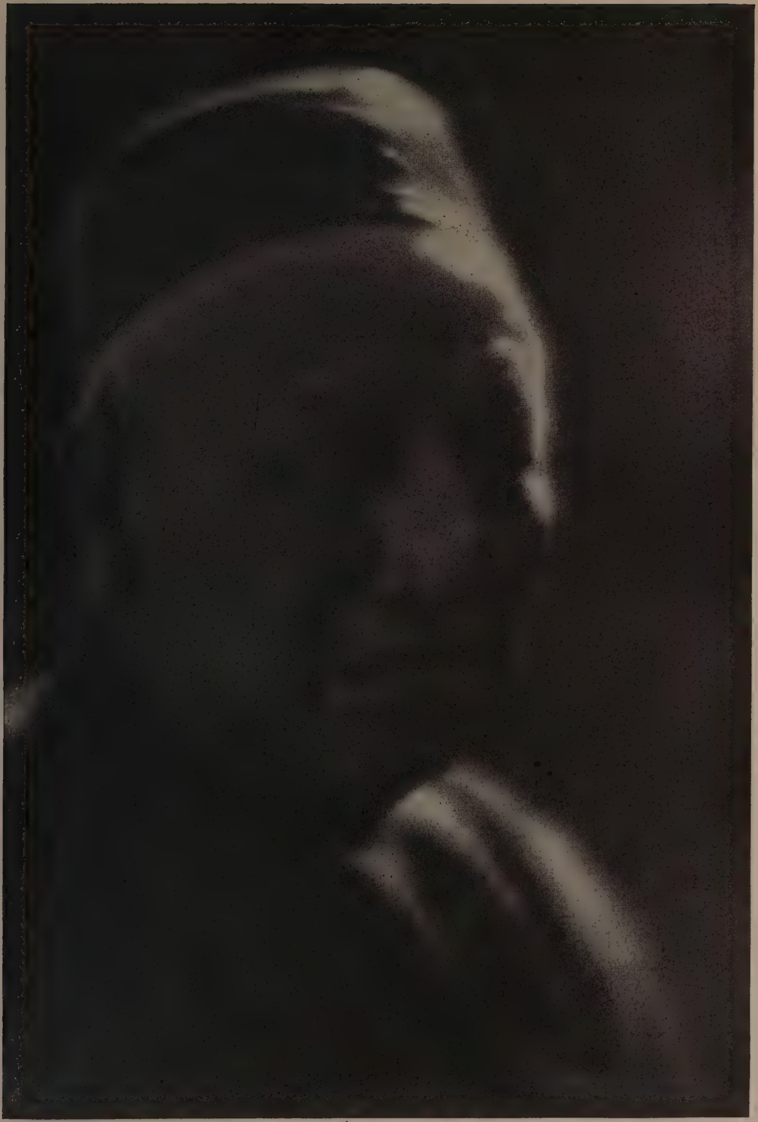
Keeping the physical body in training, is well understood by most people, to-day, both from the standpoint of why, and of how. In order to build up bone and muscle we must use them. In order to build up mind, character, and personality, the same thing is necessary. That is, we must have stimuli in which to react, difficulties to meet, problems to solve, obstacles to overcome; we have to have a consistent aim, something on which we work consistently and are trying forever to build up.

Yet, our civilization to-day is tending to kill those very characteristics that originally gave man his superiority over the rest of his fellow-protoplasmic structures. It tends to make a man a cog in a machine, without imagination or initiative. If we want to keep that superiority, and the keen alertness that makes it possible, hobbies will help us—baseball, golf, mah-jongg, aviation, floriculture, fencing, stamp-collecting—and some are more beneficial than others.

II.

THE BEST OF THEM ALL.

Fortunate is the man who has selected or blundered into amateur photography as a hobby; fortunate both for his personal happiness and satisfaction, and for this "training" to which we have referred. It appeals to all sides of a man's nature; it is work and play, easy and difficult, outdoors and indoors. And all the while that you are busy with the many



AH WING, CHINESE ACTOR. CLIFTON TARRENCE MAUPIN.

and varied phases of it, you are working on one unified subject, toward one consistent end. Or, if you like only certain sides of it, and feel that you do not need or do not want other phases, you can pass the buck, so to speak, and have someone else do the rest.

Photography, if it does anything, appeals to and satisfies our craving for outdoors and our love for Nature, things which are inherent in every man except the hopeless rascal. Many men, who do not know any better, seek to satisfy this by means of hunting and fishing. Our hunters and fishermen care little for the spoils they bring back; they are merely answering an impulse in their natures that dates back from the ages when man lived in close communion with Nature, and as part of it. The hunter with the camera as a rule gets keener sport, requires more skill, and derives greater satisfaction from his game, than the hunter with the gun or rod. Not only all living things, but even inanimate Nature, in her choice and beautiful bits, and in her vaster and grander moods, are the legitimate quarry of his chase. If you love outdoors, there isn't room enough out there for you, if you get interested in seeing it with a camera. If you love Nature in all her manifestations, you have a life's work ahead of you.

Or are you interested in human nature, in its infinite ramifications and the unending interest of its relationships with the world it lives in? There is no more faithful a companion than your camera to accompany and aid you in your study of people's faces, moods, and occupations. Furthermore, the camera will reveal phases of human nature to you that you would never discover otherwise, and record them for you, for future comparison and classification.

Perhaps there is a scientific bug in your nature. If you are chemically inclined, there is enough dabbling about photography to delight your soul. If it is physics that seems to attract you—by the way, physics is getting more and more difficult to separate from chemistry as time goes on—photography has a number of points in which it appeals to you. The subject of light and its physical properties is one of the most fascinating chapters in physics, even though Einstein has thrown a brick into our playhouse recently. Even the mathematician cannot get away from us; we have problems worthy of his steel, notably in lens design, but in various phases of

THE OLD GATEMAN. C. H. THOMAS.

NICKOLAS MURAY.

exposure and development as well. The above sciences deal with the basic processes of photography; for a thorough understanding of photographic processes, it is quite necessary to be to some extent a chemist, physicist, and mathematician. You can indulge in your love for these sciences, and dig right into the heart of photography.

But photography does not limit you to these sciences by any means. Suppose you are a born botanist. Of course you are

WINTER'S MANTLE.

C. BLICKENSDERFER.

good with the drawing pen and pencil, and can draw perfectly any interesting specimen. But how much more quickly and plentifully you can make pictures of your finds with a camera. Today, no natural science can get along without the assistance of photography; and whether your interest lies in geology, or birds or trees or bugs, photography will make your hobby more intensely interesting to you and more valuable to yourself and others. Even in bacteriology and pathology, the camera is useful, for in these many specimens are found which will not last forever, and which must be recorded; and photography can do this far better than drawing.

I prefer, however, to consider the man who takes photography itself as his hobby. I think we are justified in referring to photography as one hobby, rather than as a multitude of them. Yet, this one hobby gives its rider an opportunity to indulge all of the varied sides of human interest activity that Nature has endowed him with. He can satisfy his craving for hiking outdoors and for close application indoors; for keen and rigid science; for the inspiration and the thrilling but indefinable happiness that comes from the pursuit of art; for historical research, and for inventive mechanical ingenuity. All these needs, photography will fill. Is there any other one thing that will do more to enlarge one's general culture? Is there any other one thing that will bring together into one field of intellect, a vast variety of otherwise unrelated interests?

The pursuit of photography for pleasure, will in itself, and without other assistance, give a man an education that can take its place proudly beside a college education.

There are two reasons why I consider that the "training" that amateur photography gives a man is very valuable to him as a citizen of his country and community. Especially true is this if it gets him young. With all the wide variety of activities and interests included in photography, making it possible for one to indulge his changing fancy and restless craving for variation, nevertheless one is always working consistently toward one end, building on one structure. Photography is miscellaneous, yet unified. It keeps a man's ideas

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George Maillard Kesslere, B.P.

bound together and teaches him the value and method of keeping his life consistent and purposeful. Whether he is out on a hike, or screwing together the enlarger he is making, he is nevertheless working toward one end, a picture.

The other reason is, that with all its pleasure, photography involves some drudgery. Personally, I detest washing plates, films, and prints. But, it's got to be done, in order to get the desirable kick out of the game. You've got to take the whole chain, or none. If there is anything that this country of ours lacks and needs to-day, it is discipline. The young man who gets interested in photography, and gets that spontaneous training, is in line to do something big for his country some day.

Most of what I have written above the average reader already knows. The man who is an enthusiastic amateur in a serious way has already reasoned it out for himself many times, probably. (I think these remarks will hardly include the gleeful holiday snapshooter.) But, now and then a fellow gets to doubting himself. This world drives us along so strenuously that in modern America it is almost a sin to step aside from your work for a while and play a little. But, like Browning,

"I want to know a butcher paints,
  A baker rhymes for his pursuit,
Candlestick-maker much acquaints
  His soul with song, or, haply, mute,
  Blows out his brains upon the flute!"

SNOW PICTURES

By DR. HERMAN W. BARR

AN amateur with but little experience in making snow pictures usually thinks they are easy to get. So they are; but to secure the real effect of soft snow and cold atmosphere is quite a different proposition. Anyone can secure the hard blacks and whites without the cold frosty air and soft gray tones for snow.

The following is the method I use to obtain these results. I use the Eastman Panchromatic films and a K2 Wratten & Wainwright filter. The picture entitled "Entrance to Shevlin Park" (Figure 1) was made with a Struss Pictorial 9 inch lens on a 5 x 7 film. It was a bright afternoon about 2.30 o'clock taken toward the light, K2 filter, stop F/8; time about 2 seconds.

I develop my films by tank method with a stock solution made up as follows:

64 oz. warm water 120 F.
3 oz. sulphite of soda (anhydrous)
1 oz. Cumminone
2½ oz. carbonate of soda (anhydrous)
25 gr. potassium bromide.

For tank development take 1 oz. stock solution to 10 oz. water, temperature 65 to 75 F. Time about 20 minutes. For tray development, film or paper, 1 oz. stock solution to 3 oz. water; time 5 minutes for films, and 1 minute for paper.

The above developer with panchromatic films has wonderful latitude. I have made exposures of 1 second and 2 seconds on same subject, and both negatives were about of equal quality. Have also forgotten my batch of films and left them in the tank for 1 hour, and still had good negatives.

Another feature of the Cumminone developer is it keeps for weeks, and the tank solution can be used over and over till it begins to decompose. When using it in this way add from time to time the tray developer which is made up 1 to 3. This keeps up the strength. It is also non-poisonous.

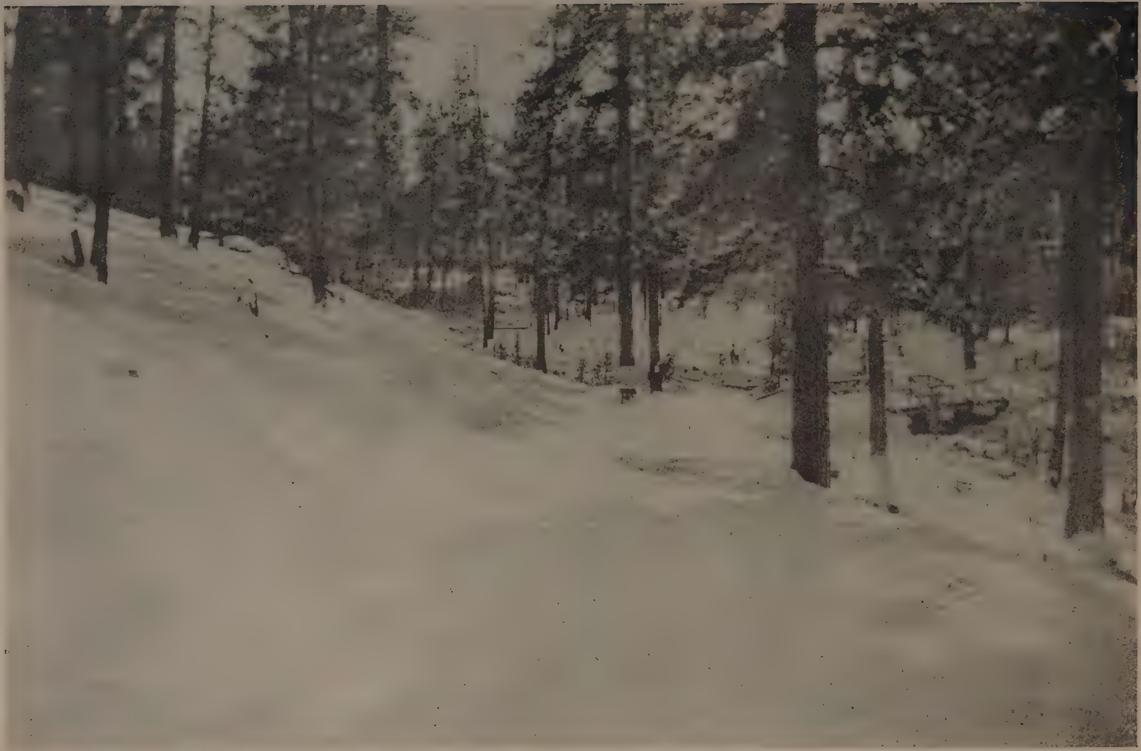


Figure 1.

ENTRANCE TO SHEVLIN PARK.

Illustrating article "Snow Pictures," by Dr. Herman W. Barr.

Wide control of contrast is secured by varying the dilution of stock solution. Increased contrast is obtained by adding more water which slows up development somewhat. Soft results on either positives or negatives are obtained by using the developer stronger than regular.

My method of making the prints from snow negatives is very simple. For paper I do not confine myself to any certain light, but try and use a paper suited to the density of negative, and print weak enough to develop in a gray tone.

If paper is exposed to light about the same as an ordinary landscape, snow pictures will come out black and white, but if you rather under-expose prints, then you will secure the soft gray effects.

I get more real pleasure out of making snow pictures than any other subject, and if I have succeeded in making one amateur an enthusiast I will have accomplished my object in writing this article.

THE ROAD GRADER. EDWIN FRANKLIN DREHEE.

CRATER LAKE.

DR. HERMAN W. BARR.

THE CARBRO PROCESS

By FRED T. USHER

CARBRO is a process with a future. We shall make better acquaintance with it as we grow older. Exhibitors and professionals will see to that because, apart from oil and bromoil, there is no medium of photographic expression which makes a more effective appeal to the pictorial worker, the professional, or amateur. Why?

In the first place it has evolved from, or perhaps one should say it is a development of, the carbon process, which is old, but not old-fashioned. Not one of the newer methods of photographic printing has been able to oust it from favor. The pictorial worker and the print-buyer alike remain faithful to its charm. This for a very good reason. Anything more beautiful photographically than a first-class carbon print has yet to be discovered. Nothing more photographically permanent exists. For depth and richness, and for wealth of liquid shadow, there is no known process that is likely to pull it off its pedestal, and take its place.

But there has always been one drawback to the worker with a shallow pocket. In order to produce a picture of fairly large dimensions, and so come into line with prevailing fashion, the process demands a negative of corresponding size. That was not a serious matter in pre-war days, but it is an entirely different proposition to-day when the price of large plates is almost prohibitive to the worker of small means.

The carbro process sweeps away this obstacle at a bound and opens up a new and important field for the exhibitor and especially for the go-ahead professional. It enables one to make one's negatives on small plates from which enlargements may be made to any size within reason, and from the resulting enlargements one may produce genuine carbon prints that are straight photography in the best sense of the term, and very beautiful too.

It may be said that this argument cuts no ice with the photographer who is not straight. I must apologize for

THROUGH THE BACK WINDOW. CHAS. A. HELLMUTH.
(Bromoil)

the expression and put it in another way. I am really trying to identify the workers who only recognize quality in a photograph when it proclaims the individuality of its author. Well, it is possible to make a straight enlargement in the usual way, cut it about, stump it, reconstruct the drawing of it and copy what is left. From the copy negative it is then easy to make a big enlargement fully charged with individuality, and from that make a carbon print by means of the carbro process. This little digression, frivolous as it sounds, is meant to emphasize the wide range of service which this process offers. In the works of the Autotype Company in London, the home of carbon and carbro, prints measuring up to forty inches in length are being produced by this latest development. The idea of making such carbon prints direct from an original negative would leave the average worker breathless.

But, it may be asked, is the carbro process really a carbon process? The answer is decidedly in the affirmative. In the old process we sensitize a sheet of carbon pigment paper, dry it, expose it behind a negative, develop it in hot water, and as a result we have a photographic image in a given tint, the color being true to the color of the pigment paper selected. In the new process we sensitize a sheet of pigment paper, squeegee it into absolute contact with a bromide print from which it absorbs the image, and develop it in hot water. In both cases we must transfer the pigmented gelatine with its inherent image, to a suitable support and develop it out on that support. This enables us to select our base which may be smooth or rough, white or tinted. In the end we have an image composed of tinted gelatine on a pure base, free from chemical impurities, and containing no factor which can possibly detract from it qualities of beauty or permanence. There is a difference in method of working in the two processes but the resulting picture is a genuine carbon print in each case.

Recent experiments have proven that the method is applicable to the **oil** process and an oil print can be made from a bromide enlargement, but that is another story and an interesting one too. The salient fact to be borne in mind is that the carbro method enables us to dispense with the large negative in the making of a carbon print, and in the making

WM. SHEWELL ELLIS.

of an oil print. That is a revolution for which exhibitors and professionals generally will be devoutly thankful. When the enterprising Autotype Company have had time for further experiment we shall no doubt have more food for thought and practice, but they have given us enough to go on with for the present.

The handling of a carbro print presents no difficulty to the photographer of average skill. Pigment papers in various colors, and transfer papers of many grades and surfaces are obtainable, and both will keep indefinitely before use. Three simple baths are required for ordinary work, the sensitizing, acid, and the alum, or clearing bath. A stock solution of the first is made by dissolving one ounce each of potassium bichromate, potassium ferricyanide and potassium bromide in a pint of water. This is bottled and labelled No. 1 stock solution. The stock solution of the acid bath is made up as follows: Glacial acetic acid 1 ounce; Hydrochloric acid (pure) 1 ounce; Formaldehyde (40 per cent) 22 ounces. This is bottled and labelled No. 2 stock solution. The alum solution is simply ordinary powdered alum made up in a 3 per cent solution which may be used repeatedly while it remains good.

For immediate use the sensitizing solution is produced by adding 6 ounces of No. 1 stock solution to 18 ounces of water, and the acid bath by adding one ounce of No. 2 stock solution to 32 ounces of water. To set about the business in the correct manner place a sound bromide print Platio for preference or enlargement, that is to say, a print of good gradation and color which has been developed right out, in a dish containing plenty of clean water. Leave it there until it is thoroughly soaked, say ten minutes, or more for thick papers. We then take a sheet of pigment paper of any selected color and slide it under the sensitizing solution face down, gently rubbing off any airbells which have formed on the back. Now, turn it over and rock away any airbells which may have formed on the face, taking care to avoid contact with the fingers at this stage, turning it over again, and rock the dish until the sheet lies flat. Three minutes is a safe time for the whole operation of soaking.

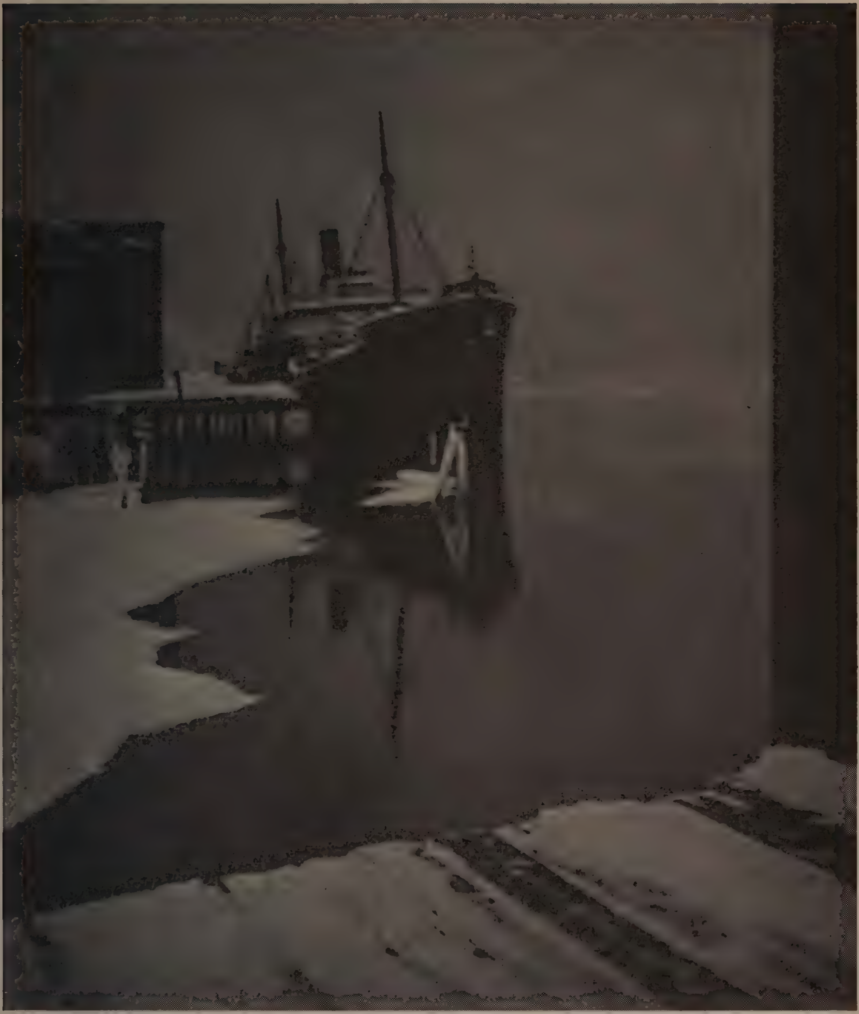
Next proceed to the acid bath. Picking up the sheet by one corner allow it to drain a few moments, and drop gently

THE OLD BARNYARD GATE. CARL A. DISTLER.

into the acid solution, wasting no time in getting it under. We have now arrived at a very important part of the proceedings. If a normal print is wanted leave it there 20 seconds, a stronger print requiring fifteen seconds, while a print that is softer than bromide needs 25 seconds. We photographers like to roll our tongues about the magic word latitude, and we have surely plenty of it in the carbro process, for we can make three grades of carbro prints from one bromide print.

Take care of temperature. This is just as important in the carbro process at it is in the other photographic processes, perhaps more so. The usual working temperature of solutions, viz: 60° to 65° F. is about right for all solutions, and special attention to this factor will avoid little troubles that, of course, ought not to arise.

Suppose we have decided for the normal grade, that is the one faithfully representing the gradation and density of the bromide print. At the end of twenty seconds we lift the sheet up by two opposite corners, and lay it face down on the bromide print, which we have taken the precaution to place on a sheet of glass with a pool of water lying on the print. Resting the fingers of the left hand along the edge of the pigment paper, we use the right hand to rub out the water from between the two sheets with a flat squeegee. In doing this we must be certain that no movement of the sheets in contact takes place. The solution acts at once, and if we move one sheet after the two have touched we shall have two images instead of one. Therefore the fingers of the left hand must take a firm hold, and the first stroke of the squeegee must be straight and steady from the fingers across the paper. When all the water has been expelled the attached sheets are laid aside between sheets of water-proof paper for a quarter of an hour. During this time we select a suitable piece of paper which is to be the base of our finished picture and soak it in water. At the end of the fifteen minutes place the transfer paper on the sheet of glass, gelatine side up, and then separating the squeegeed sheets at one corner peel them apart, and throw the bromide print into the water. Both hands now being at liberty we lay the pigment paper face down on the transfer paper, and squeegee them into contact. The two papers may now be laid aside between blotting boards



DR. RUPERT S. LOVEJOY.

for twenty to forty minutes during which time we can make other prints.

The time of contact being up we can proceed with development which is as simple as A, B, C. All we have to do is to lay the transfer paper and adherent pigment paper in water of 90 to 100 degrees Fahr. and the color will begin to ooze around the edges of the pigment paper. When the oozing is fairly liberal we raise the pigment paper at one corner and strip it away. There is now left on the transfer paper a mass of colored gelatine which gradually floats away as we rock the dish. As the colored mass disappears the image takes its place, and the process is hastened if we gently lave the surface with the warm water, using the hand as a ladle. In a short time we find on the transfer paper the image of the bromide print, reproduced perfectly as to detail but colored according to the tint of the pigment paper which we selected for our purpose. If we have not seen a carbro print before we shall probably be astonished at the beauty of it.

Here are a few hints worth remembering: It is a great advantage to make the bromide print with a white margin. In the first place it enables one to place the carbro print in the center of a large sheet of transfer paper, leaving a margin as wide as one likes, and in the second place it facilitates working. When putting the pigment paper and transfer into contact it is very necessary to have a safe edge on which the fingers can be pressed to hold the two sheets firmly during the operation of squeegeeing. The white margin on the bromide paper supplies this safe edge. Without it we must see that the pigment paper is half an inch larger all round than the bromide paper.

For those who like to experiment in more than one color the carbro process will be found to be a fascinating medium. By bleaching parts of the bromide image with a sable brush we may develop those parts in one color afterwards bleaching the other parts, and developing in another color.

When development is complete no fixing is required because our image is made up of pure gelatine and pure pigment, and there is nothing in it that can be affected by light or time, but there is a certain amount of bichromate left in the paper, and that must be gotten rid of before it

TRINITY CHURCH.
(Bromide)

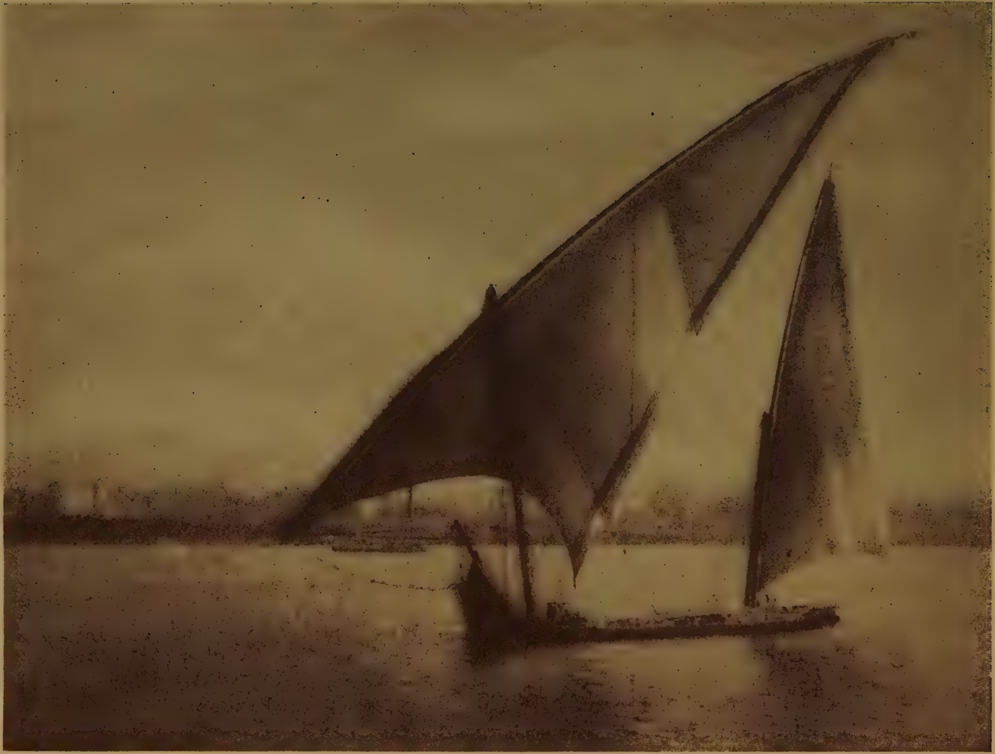
REUBEN B. AZHDERIAN.

dries. This is done by placing the print in the alum bath for a few minutes. A short wash to get rid of the alum is all that is required to complete the process.

Quite apart from the beauty and permanence of a print made by means of carbon tissue, this process has a tremendous attraction for the worker who has realized its advantages. The color of the image has a vital effect in exhibition work, and while no one would desire to minimize the beauty and attractiveness of a first-class bromide print, we photographic workers know that it is not easy to produce precisely the color that we desire by that deservedly popular process once we have departed from the pure black. Here carbro scores heavily. No matter whether it be cold black, warm black, dark brown or light brown, cold sepia or warm sepia that we need for the satisfactory rendering of the result which we are aiming at, we can obtain it with absolute certainty, and repeat it as often as we like.

The mention of the word "repeat" reminds me of another fact of considerable importance. At the end of the operations described above we find ourselves in possession of a sheet of bleached bromide paper and a sheet of paper which was originally the pigment paper. This latter sheet of paper we throw away as being of no further use, but the bromide paper we treat as valuable and wash it for fifteen or twenty minutes. After washing we re-develop it in an amidol, metol-quinone or metol developer, wash it again and keep it for further use. We can make other carbro prints from it until it is worn out with use, and they will probably be of better quality than the print which we made originally. For some reason the second print is usually an improvement on the first, a fact which may be due to a certain extent to the slight intensification which takes place. The fact that development reaches absolute finality in the second development may also have something to do with it.

Thus, in carbro work, we have several important advantages in making pictures. They are worth recapitulating. Our image is a pure carbon print; it can be made from a bromide enlargement instead of from a large negative; it



ON THE NILE.
(Bromoil)

Col. James A. Andrews.

can be made in any selected color and that color can be repeated as often as desired with absolute certainty; we can make several carbro prints from one bromide print, or enlargement without deterioration of the result; we can put the carbon image on a paper base of any size, surface or quality; we can if we desire make our carbro print in one or more colors. All this we can do in broad daylight. No dark-room is needed at any stage of the proceedings and carbro prints require no fixing bath. What more could an enthusiastic worker want?

CHAS. W. DOUTT.

THE PLATE CAMERA OR THE ROLL FILM CAMERA

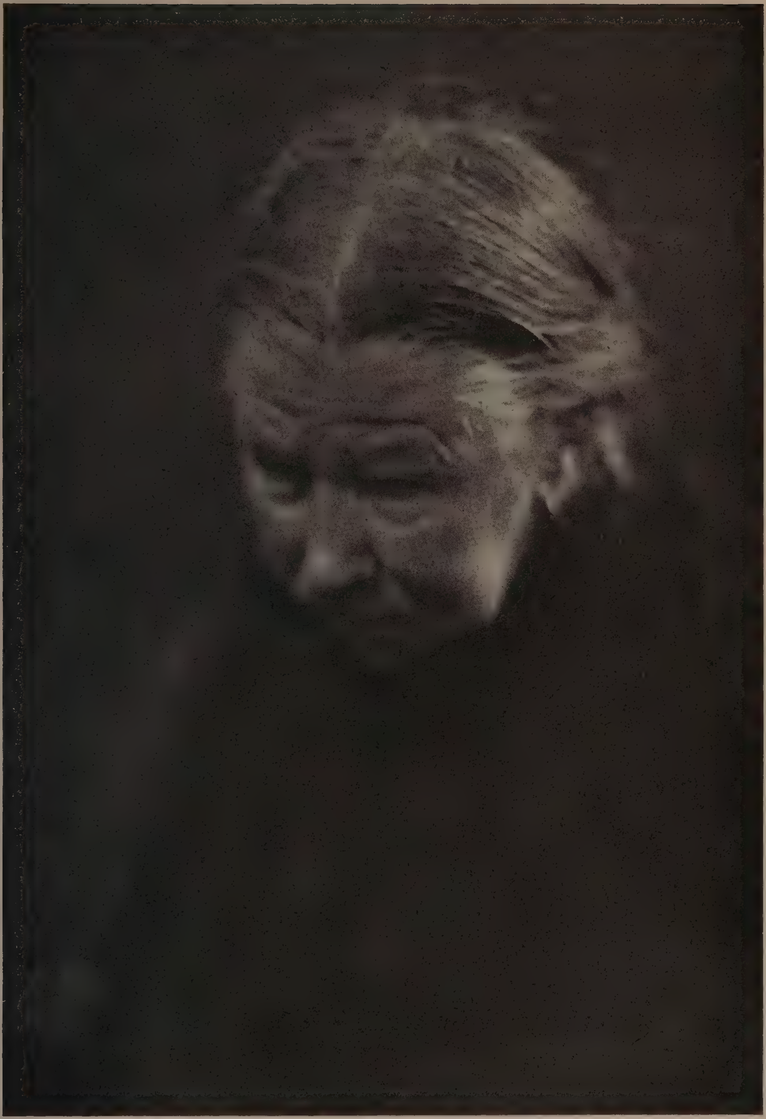
By H. J. SHIPTON

THERE have been many discussions on the relative merits of the Reflex type of camera versus the hand camera, and the miniature camera versus the hand camera, but there are some amateurs who will not admit that there is any comparison between a hand plate camera and a roll film camera. To those of such opinion, perhaps this article will furnish some enlightenment, coming as it does from one who has used both.

The roll film camera of today is one that is a marvel of simplicity and compactness. Everything that is possible has been done to get a maximum negative with a minimum amount of time and thought. The camera is equipped with such modern conveniences as range finders, self framing mirror, view finders, and others. There is a wide range of lenses to be had, from the meniscus working at U. S. 16 to the modern anastigmat working at F 4/5.

With a roll film camera of the folding type as used by the more advanced amateur, there are two questions that must be answered each time a picture is exposed. Has the distance been estimated correctly, and if so is the pointer on the focusing scale at the proper place? Does the composition include all that it should, or has a portion of the important part been cut off due to the limitation of size of the film? The answer is this—it is not known positively until the film is developed. There is only one *sure* way of answering the above question at the time of exposure, and that is by composing the study on the ground-glass focusing screen. The time of exposure, of course, is regulated either by meter or by experience.

There are very few roll film cameras on the market that have sufficient bellows extension for close up work such as portraiture, or flower studies, and if one is used which does have the required extension, or if an auxiliary lens is used instead; again there is the question—is it all on the film? The view



STUDY.
(Carbon)

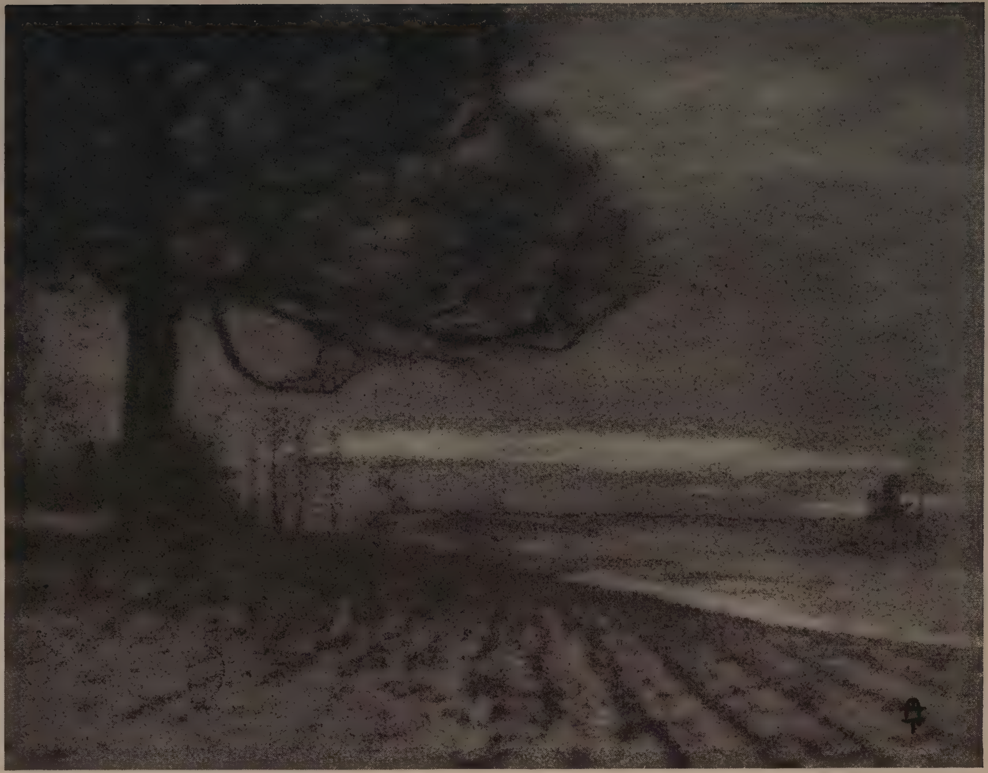
A. S. WEINBERG.

finder is useless here, it is made to operate according to the focusing scale on the camera. Plate cameras may be obtained with bellows extensions of, from fifteen to twenty inches which will do anything within the scope of the advanced amateur. Any lens and shutter equipment is at the command of the owner of the plate camera also. There is the added advantage of composing the study on the ground-glass and knowing positively that all of the important features are on the plate in their proper positions. The danger of cutting off a portion of the sitter's head is entirely eliminated.

Many roll film cameras have a rising and sliding front standard for the lens, but I have yet to see the roll film camera that has that invaluable addition to the rising lens board; the vertical swing back. Again—using the hand camera for serious work in the field, requiring a tripod, there is nothing on a roll film camera to approach the revolving back of that tried and true friend, the plate camera; by which the composition can be changed from a vertical to horizontal form without removing the camera from the tripod or otherwise disturbing the viewpoint or focus determined upon. This is impossible with a roll film camera.

For almost every amateur the Reflex camera is the ultimate goal of his affections. The Reflex to-day is supreme in its field. Admitted. But most Reflexes are first and last plate cameras. There are only one or two Reflex cameras that I know of that are built regularly for roll films, and which cannot be adapted for plates. The others must be adapted to roll film and film packs by the use of special holders or adapters, which are listed as accessories and extras both in cost and use. The homely old-fashioned plate camera has one slight advantage over even the kingly Reflex, and that is this: The Reflex is a camera for speed work, and as such is indispensable. When used for time exposures at a small aperture there is most always a slight jarring due to the type of shutter used. There is almost always the danger of the negatives becoming blurred in this type of work. Here the hand plate camera excels. I do not underrate the Reflex, it has a fond spot in my heart, but for all-around work I prefer the ordinary plate camera.

I am not attempting to prove that the plate camera is a cure-all—a panacea for all photographic ills—but in most



NOVEMBER FIELD. G. Y. TANGE.

cases outside of snapshots it will do serious work better than a roll film camera of the same grade, size and type. In the final analysis the user of the roll film camera is practically dependent upon one film emulsion. The user of the plate camera has at his command all the various types made for some particular work, such as process plates, double coated plates, non-halation plates, etc. There is a plate for almost every type of work.

There is the matter of distortion. With a roll film camera, looking into the view finder, the subject will probably not show any of the effects of distortion. The image shown is so small that the characteristic effect would hardly be noticed. With the plate camera it would be noticed at once on the ground-glass focusing screen, and steps taken to correct it.

To sum up, the roll film camera has the following advantages over the plate camera: It is compact, it is daylight loading, and for snapshot work it can be gotten into action slightly faster than the plate camera.

The plate camera has the ground-glass focusing screen, the revolving back, the vertical swing back and the extra bellows extension. It can be used for snapshots, but it is not daylight loading. This to my mind is the only disadvantage for the plate camera. So far as compactness is concerned a 4 x 5 roll film camera will take up by its extra length the room needed by a square 4 x 5 plate camera. A carrying case accommodating a plate camera and six plate holders will not weigh much more than the roll film camera, with the extras needed, such as supplementary lenses, extra roll film, etc., being carried in the pockets. The plate camera has the four advantages above noted which cannot be approached in a roll film camera. The roll film Reflex is the nearest thing at present to it. Perhaps it might be well to note that there has recently been placed upon the market a new 4 x 5 view camera, using plates of course. I think this shows more than anything else the trend of the advanced worker toward the plate camera. No outfit is complete without one good plate camera.

THE RAVINE. ALEX. KEIGHLEY, F.R.P.S.

GLACIER PARK—AN IDEAL MOUNTAIN RESORT FOR THE CAMERIST

By ALLEN P. CHILD

UP in the northwestern corner of Montana the United States has set aside 915,000 acres of mountainous country as a National Park. It is more than a mere place to spend your summer and your money. It is a paradise for the amateur photographer. I cannot say, with authority, that the gentleman or gentlemen who steered the bill through Congress making this tract of ground a National Park were devotees of the snapshot cult. I believe there is plenty of safety in claiming that they were.

The Great Northern Hotel Company maintains a series of Chalet hotels throughout the Park which will prove a pure delight to the camerist, if he wishes to retain a few atoms of the civilized life of the cities. The Swiss architecture of the buildings forms delightful excuses for pictures of an Alpine flavor. Every window is a rustic frame for a scene of unparalleled beauty. The hotel management may never have known that I developed negatives in my bedroom, using the washbowl as a washing dish, but I feel that if they had found it out they would never have objected. The spirit of hospitality, the make-yourself-at-home style is everywhere prevalent.

For the person who wishes to camp out there are tepee colonies managed by the hotel company where lodging and food may be secured at the very lowest of rates, and if your tepee is near a lake or stream you are fixed better than ever for doing your developing on the spot. But camping is the ultimate joy for the person who has the camera fever. To pitch your tent by a rippling cold stream flecked by the vagrant shade of surrounding pine trees; to prepare your meals over a crackling fire; to tie up the tent flaps before starting out on your daily picture tour; to come home at night to develop your negatives in the shelter of the tent; to wash the sparkling gems dripping wet with hypo in the nearby stream; why, these are

ANGLES AND SHADOWS. G. H. S. Harding.

the things that overload a summer camera trip with the blessings that come only with unadulterated satisfaction. Developing your own negatives is the most possible thing you could think of in planning a trip to Glacier Park.

From the hotel at Glacier Park there are many trails leading toward the mountains where leafbound vistas of distant peaks will surprise you with their suddenness and diversity. The automobile trip to Lake St. Mary is one long panorama of snow mantled peaks, winding ribboned road and rolling green prairies. The drivers of the automobiles are naturally, or artificially, desirous of stopping whenever a passenger, or as many times happens, a group of passengers wishes to take a picture of some specially entrancing stretch. Then you get another chance to get some views with water and tourists as a dominant feature when the driver stops on the bridge over a wild mountain stream to fill up the machine's radiator. It will not pay to sneer at the anxiety of the shutter clicker.

Lake St. Mary, a sheet of azure blue set in a frame of forests green and mountains rainbow hued, is about nine miles long. You will find it impossible to stir more than ten feet outside of the hotel door before you will run back to your room for the camera so as to record that bit of beauty, and once outside you keep going till before you know it you have spent the whole day snapping at the mountains and trees around Lake St. Mary. You begin to think that you are in danger of exhausting the possibilities of the Park. You are merely beginning. About a mile outside of St. Mary Camp, to the north, you will find an old deserted mining village; streets grass grown, cabins staring wildly at you, cellars yawning here and there. If you don't have some fun taking pictures in that place I will miss my guess!

Some morning cross the bridge over the St. Mary River and follow the trail, if you have self control enough to stick to it, till you reach Going-to-the-Sun Mountain and the camp nearby. From the Golden Stairs, which you will not think so golden while climbing, you will get vistas which could be duplicated nowhere else in the Park even if they could be outdone. The click of camera shutters has disturbed the silence of that trail many a time. If not, so much is the pity. Everywhere you have the lake and if you are tired of snapping city streets and brick buildings you had better get busy shooting at it.

The camera carrier who walks with his head at a downward angle and a neck of no muscular discipline will miss a thousand things that the person whose head is up and turning about in all directions will see, take and develop.

Many people go to the mountains and come back. That isn't exactly all they do. They say that when you've taken one picture in the mountains you have taken them all. All of which is true enough if the view-finder is not put to work looking around for things of a different aspect. Along any of the trails in the Park you are liable to meet pack trains and your opportunity comes to get some life, some real mountain life, into your pictures. Be prepared for such encounters; they are vastly worth while recording.

The walk from St. Mary Lake to Many Glacier Camp is a long one. It covers twenty-five miles of road for the undeviating pedestrian, but the wise camerist will walk about fifty miles in an earnest desire to do justice to the thick strewn beauties of the journey. For those who desire not the exertion of foot travel there are other forms of conveyance, useless photographically except as subjects. Circling the two St. Mary Lakes the road leads over gently sloping hills and valleys carpeted with dew, refreshed grasses and flowers. Every patch of riotous color will bring forth a mental argument over ray filters and a longer discussion over exposure. Shyly peeping out of some woody thicket will be a massive bed of wild forget-me-nots; the sheen of the silvery lake beyond, the boldly radiant beauty of the distant mountain all form a picture which will tax your ingenuity to the utmost in the matter and manner of recording. If you get tired you'll never notice it in the joy you get out of the endless possibilities. Far in the distance Chief Mountain, red as a flame of fire, stands a sentinel removed from all the other peaks. It defies you to take its picture. You know it is almost impossible to do so, satisfactorily, at such a distance. If you had wings you would not lose much time flying over to accept the challenge.

Surrounded on every side by towering mountain peaks, swift flowing rivers, mirrored lakes, forests dark, flowers wild, and noisy waterfalls, the visitor at Many Glacier Camp will never want for new combinations of Nature's synthetic essences for the making of pictures. Grinnell Mountain casting its bold sides into the crystal clear waters of Lake McDermott

DUNE LIFE. E. G. BRAND.

makes a perfect poser from any one of the million points from which it can be taken. Here are the most ideal surroundings for procuring prize winning mountain pictures. I met a man from Massachusetts one day, wandering extravagantly around the rocky bluffs which imprison the beautiful McDermott Falls. He was autochroming; and with a vengeance. He told me that the chances for autochromes among these lakes and mountains was nowhere in all the wide world surpassed. He was just putting the finishing touches on a three-year tour around the world, so I took his statement for granted. Further, he threatened to stay right there in Glacier Park till every autochrome plate he had was picture stricken. I saw his stock of unexposed plates. I believe I would not be exaggerating if I should say that he must be out there yet.

You don't have to be an autochromist to appreciate the magnificence of the mountains, the vistas, the distant purpling horizons, the boiling clouds, the mountain born streams. They will all exert their influence on your proclivities, and your Glacier Park album should be full of other things than mere photographs. You should have memories, inspirations packed thick between every print. Go to Appekunny Falls for pictures of a mysterious sky pouring torrent of pearl grey water. It is hard to find, much harder to get to; but don't fail to try the trip. The trail to Swiftcurrent Pass is one continuous succession of unexpected vistas of mountain peaks, but the Pass itself contains the climax of all your stay in the Park. I pity your camera shutter when you once get breath between exertions on the upward zig trail. Far down the valley is laid out a veritable garden. The green of forest and field, the blue of many lakes, the glitter of snow, the hundred mile distant horizon crowned with violet mist, and forbidding mountain walls scarred with the marks of ages of titanic struggles are the things that make up the most awe-inspiring scene in all that northern country.

Along the trails to Iceberg Lake and Cracker Lake you will meet with many a waterfall tumbling in spraying frenzy over reddish brown rocks, you will cross many rustic log bridges

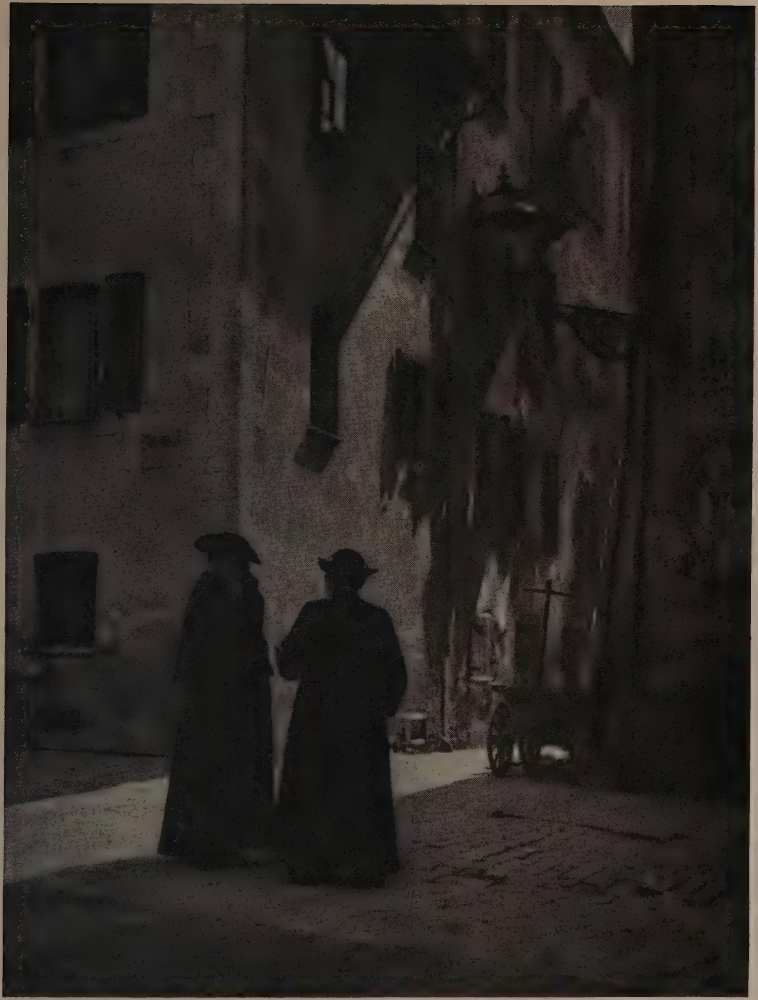
ON THE PATHLESS DEEP. REUBEN B. AZHDERIAN.
(Bromide)

over green churning glacier torrents. Snow fields perilously near flower gardens wild with dew cleared are on every side of the sloping mountains. There is an endless variety of trips over the mountain trails, and there is one saving quality in the fact that you can, if you so desire, come back to the place you call home every night and find out what success has attended your strenuous day.

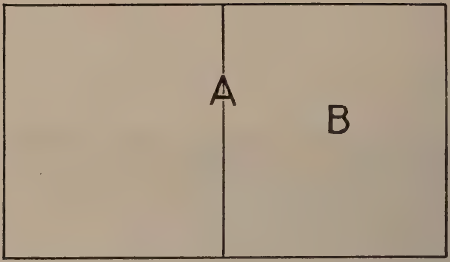
Many Glacier is the very heart of the Park, but the visitor should by no means miss Lake McDonald, which is most easily reached by Belton, Montana. By many travelers this eleven mile stretch of water is proclaimed as the most beautiful mountain lake in the world. If you have seen Lake McDonald they claim that it is not necessary for you to spend any time worrying about seeing the Swiss Alpine Lakes. Changing with every hour of the day the dense forests and the heaven spiring peaks entice the camera lens to do its utmost.

I did not spend time experimenting with various makes of plates while in the Park, but stuck to one brand, Hammer Blue Label. Having made exposures on more than two hundred plates I could say, without hesitation, that they are a very satisfactory plate for such work. The plate or film that you can do the most varied sorts of stunts with is the kind you want for Glacier Park.

From every standpoint a month of photography, for the amateur, in the mountains is worth a year of photography in the city of noise and heat.



THE CONFERENCE. LOUIS J. STEELE.



Illustrating article "Stereoscopic Pictures Without Mounts," by Gilmer Winston.

STEREOSCOPIC PICTURES WITHOUT MOUNTS

By GILMER WINSTON

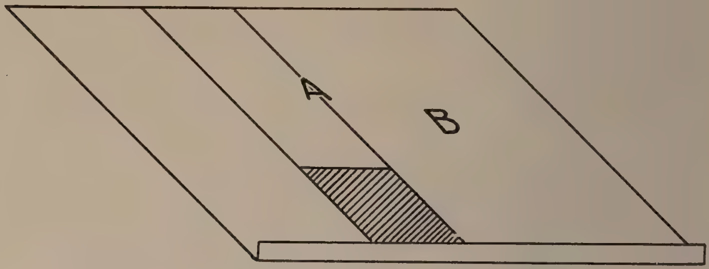
WE have all heard the old phrase: "Necessity is the mother of invention." This article gives a short description of a method of printing that grew out of the difficulty of obtaining stereoscopic mounts for sepia tones. Anyone by using this method can dispense with the mount, not only saving the cost of stereo mounts, but can save storage space besides.

Provide some 8 x 10 mask paper, and carefully fold the bottom edge over so that when the negative is placed in position the bottom edge will rest in the fold which should barely cover the margin of the negative. Cut from the mask the form and size of single stereo picture, and along each side of the opening and extending from top to bottom of mask run two heavy black lines. Place this mask in a printing machine or printing frame of sufficient size. Take a sheet of printing paper, say, 5 x 7, and rule a straight line across the back exactly in the center of the paper. Place the stereo negative with the left hand side over the opening, and with the edge pressed down in the fold of the mask place the right hand side of the paper in place with its lower edge similarly placed in the fold of mask, and see that the ruled line on back of paper registers with ruled line on left side of mask. When exposed, reverse process for other side and develop as usual.

It will be readily seen that this gives a transposed stereo

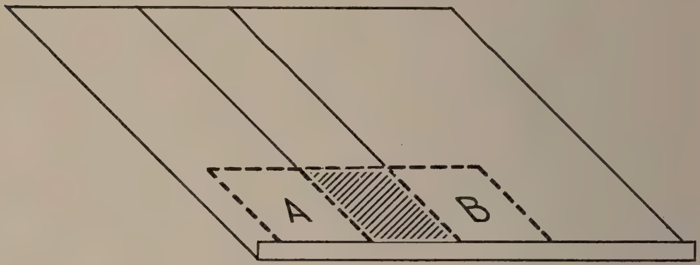
SULKY. J. ARTHUR LOMAX, F.R.P.S.

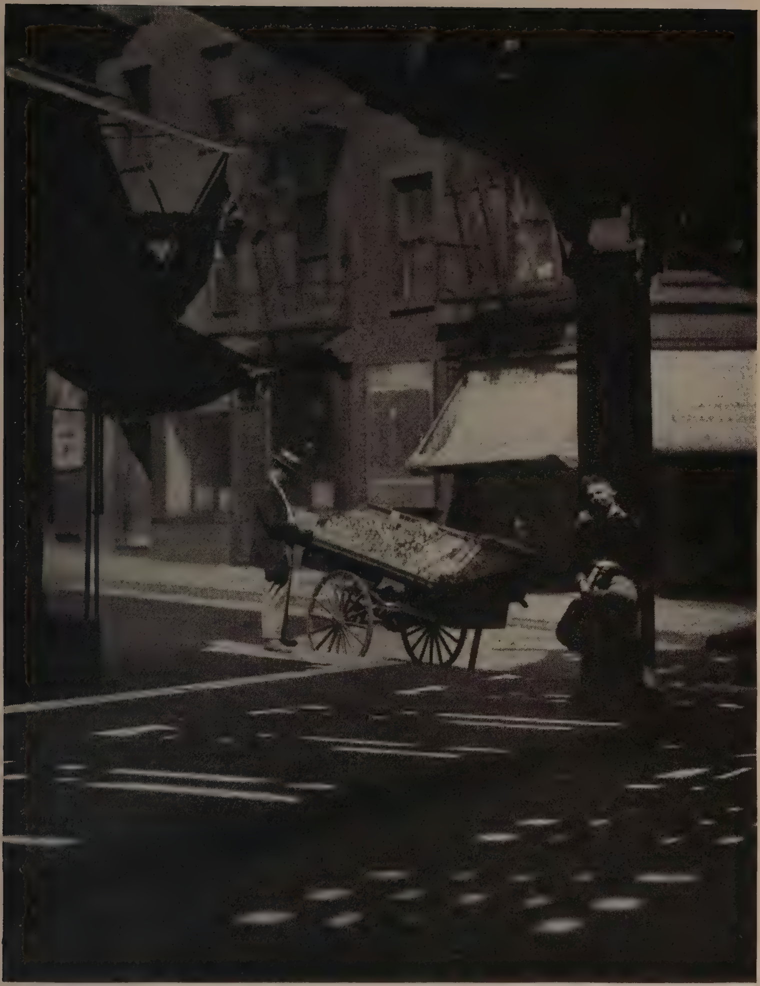
picture exactly in the centre of a seven inch piece of paper. Any variation of openings and centres can be made by cutting different masks. The writer uses about a half dozen masks with different openings. For 5 x 7 stereos about three openings will be required different distances from the folded bottom edge, as it often happens a 3¼ x 3¼ is required from near the top of the negatives.



These prints, if on double weight paper, can be viewed just as mounted prints, as they will stand in the stereoscope, but if on single weight paper, they can be placed in front of a regular 3½ x 7 card and will not fall out of place.

This method is much superior to the old one of printing, trimming, transposing, mounting, etc. The idea of the folded lower edge is to insure the two pictures being equally distant from the edge of the paper, though, of course, if a printing frame with absolutely straight sides is used, then the paper and mask can be used flush against the side of frame, but it is much easier to fold the edge of the mask and use the fold as a guide.





UNDER THE "L"—NEW YORK. CHAS. K. ARCHER.

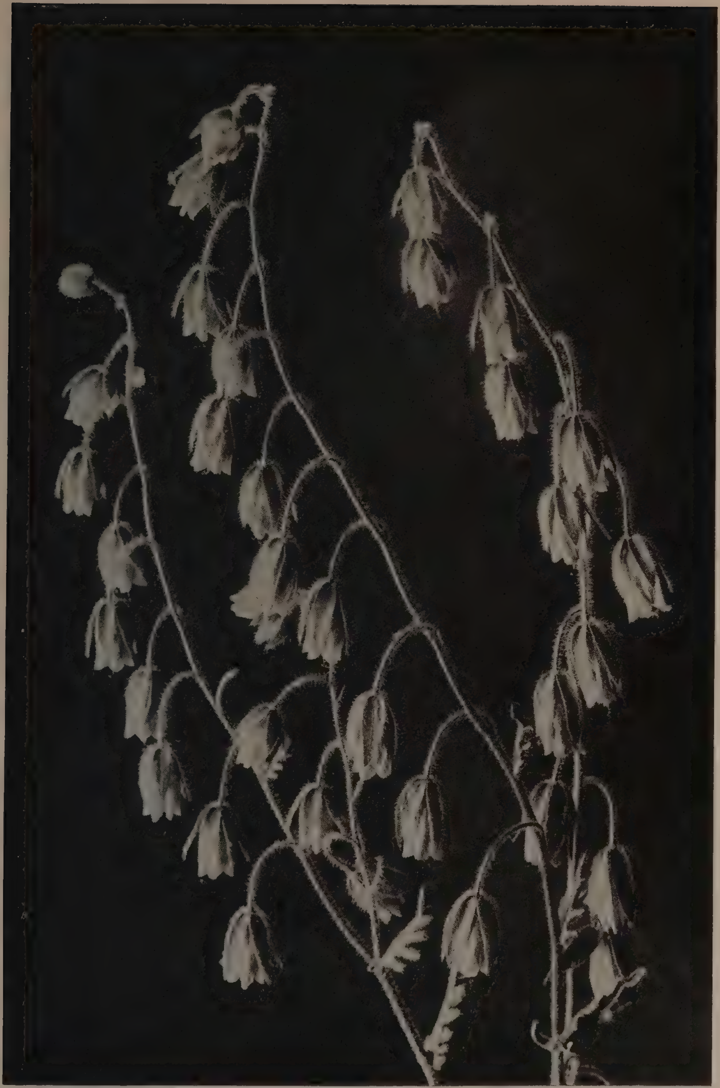
PHOTOGRAPHING WILD FLOWERS

By ANTONE J. SOARES

THE photographing of wild flowers offers a very fascinating hobby to those who are at all interested in them. They have always had a peculiar fascination for me, and when I took up photography, I naturally desired to reproduce on paper those illusive charms that make them so singularly attractive. To succeed in this line of work there are a few attributes which the individual must possess to insure success. One must have a love for the work as well as the flowers. A lot of patience is needed, as the difficulties to be surmounted are many. Wild flowers, as a rule, do not grow in proximity to one's home, so long trips are often required. It is always a problem to get them home in condition to photograph.

It is not advisable to go to any great expense to enable one to take up this fascinating hobby, as any outfit will do, provided the camera is capable of taking pictures not less than postcard size, and is also provided with a long bellows, and a lens that is not of too short a focus. A lens of short focal length is not desired, because it is apt to distort the image when employed at close range, and most flowers require to be so pictured. As the flowers one has to photograph are often of varied colors, to obtain a correct rendering of color values, one has to employ an orthochromatic plate in conjunction with a suitable color filter. This is essential. The plate most suitable for this work is one that is either backed or double-coated. In some cases a panchromatic plate may be necessary, especially if flowers of a red color are to be photographed. To avoid fogging these plates which are more sensitive to the reds, the employment of a green light, such as Wratten's, is necessary.

To obtain specimens in the right condition to be photographed is not always an easy undertaking. I have found that if wrapped in wet newspapers or cloth, and placed in a box of suitable size, they may be carried home without much



WHISPERING BELLS.
(Emmenanthe penduliflora)

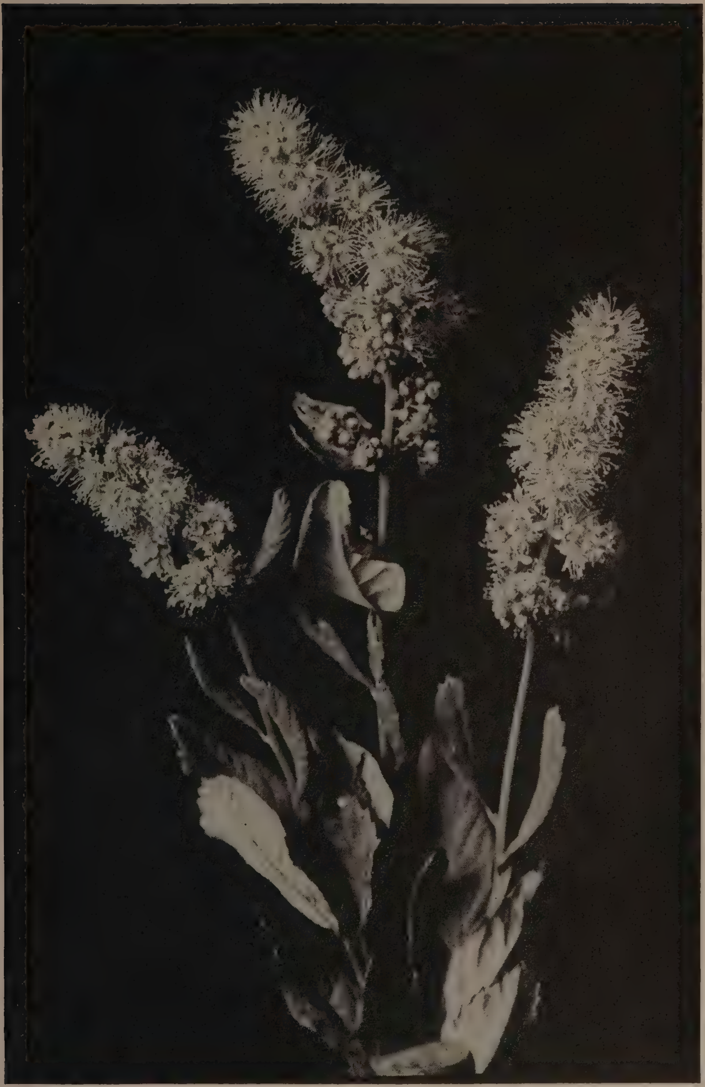
Illustrating article "Photographing Wild Flowers," by Antone J. Soares.

wilting, and will be in condition to photograph, provided they are placed in water sufficiently long to revive. If collected the day before and placed in water over night, they will be in good condition to work with in the morning. Under no circumstance should an attempt be made to picture them immediately after being culled, for shifting is very liable to occur during the exposure. It is much better to wait until they have had time to revive before any attempt at an exposure is made. With some flowers it may be necessary to plunge a portion of the stems in boiling water before they will revive sufficiently to enable one to work with any chance of success.

An ordinary room will do to work in, provided it is isolated from the main part of the building, otherwise vibrations caused by persons walking across the floor may cause trouble. Different shades of cardboard may be employed as a background, or one may have one painted to order. Being partial to a pure black ground, I have made use of a darkened room for that purpose, and with good success. To cut down the exposure required I have done most of my work on a back porch where it is comparatively free from wind, posing the flowers in front of an open door, the darkened room behind serving as a background. One may use a light background, but the same amount of relief is not obtained.

The exposure required will of necessity be long, because one has to use a small stop, and a ray screen, and this makes it necessary to prolong the exposure, varying from one minute to fifteen minutes, or even more, according to the condition of the light. To guess at the exposure would not be advisable, so it had better be determined by the employment of a reliable exposure meter, of which there are a number on the market.

To obtain a picture that is pleasing to the eye one must possess a faculty for the proper arrangement of the subject. The reading of books on the subject of composition is profitable, and the study of the work of others who are engaged in the same kind of work will enable one to improve. To throw a few specimens of wild flowers into a vase, or other receptacle, without any attempt at arrangement and expect a work of art is an utter impossibility. It pays to take all the time necessary to arrange a specimen properly, not only because



PINK SPIREA.
(Spirea douglasii)

Illustrating article "Photographing Wild Flowers," by Antone J. Soares.

of the satisfaction to be derived from the possession of a picture that is beautiful, but also on account of the material saved. If possible there should be no straight lines in the composition, but rather a series of curves and these should not intersect each other.

The greatest mistake that most amateurs make is to include too many flowers in one picture, with the consequence that the flowers appear crowded, an effect that is neither desired nor pleasant. Nevertheless, the subject should properly fill the plate, but this effect may be obtained by making the image larger and not by crowding. We may with profit take a lesson from the Japanese who often spend what we would consider an unnecessary amount of time in arranging just one blossom and a few leaves in a suitable receptacle. In no case should a composition be attempted with more than seven blossoms, and odd numbers are preferable. It is not good policy to show the receptacle in which the flower has been arranged, because to do so would only detract the attention from the principal part of the picture, which is the flower itself. It would also necessitate making the flowers appear smaller, and that would not do. The flower being the most conspicuous part of any plant should appear so in the picture, and if there are any sacrifices to be made, let it be some thing else.

Any one taking up this hobby should at least know enough of wild flowers to be able to distinguish one species from another, otherwise there will be danger of duplication. To know the wild flowers by their scientific names is a worthy accomplishment, because it makes the work more interesting, and one has the satisfaction of knowing the flowers he has photographed by their proper names.

When one's collection of wild flower negatives gets to be a large one, then some system of filing should be adopted. This obviates any difficulty of finding any negative that may be needed to print from. Each negative should be given a number, enclosed in an envelope, and stored away on a shelf, or in boxes provided for that purpose. These should be arranged consecutively. The scientific name of the flower, and its corresponding number, should be entered on the face of the envelope in which the negative is enclosed. A typewritten list with the scientific names arranged alphabetically, and the corresponding numbers, should be provided to facilitate looking up any negative required.

On the subject of development little need be said outside of the fact that one should do it himself, rather than trusting it to others. The formula that comes with the particular brand of plates one is using should be used in preference to any other, because it is more apt to be suitable. As plenty of detail is essential the developer should be diluted with about twice the amount of water called for in the formula. This is especially necessary when orthochromatic or double-coated plates are being used, as these have a tendency to produce more contrast than the ordinary plates.

DUCK CREEK IN WINTER. CHAS. H. PARTINGTON

American Annual Formulary

In the following section we have gathered together a typical collection of Formulæ and Tables, which will assist the photographer in his every-day work. It will be noticed that makers' formulæ are omitted. These can best be obtained by direct application to the makers. The appended formulæ are selected from the working methods of practical photographers.—Editor.

TANK DEVELOPERS FOR NEGATIVES

Elon-Photol-Pyro (A. L. Decker) (For deep tank development). Warm water, 32 ounces; Elon, 40 grains; Photol, 40 grains; Sodium Sulphite (Anhydrous), 2 ounces; Hydrochinone, 100 grains; Sodium Bisulphite, ¾ ounce; Potassium Bromide, 5 grains; Sodium Carbonate (Anhydrous), 1¼ ounces; cold water to make 1 gallon; add Pyro, Crystals 80 grains.

Metol-Hydro (Frew).—Water, 12 ounces; metol, 7½ grains; sulphite soda (anhydrous), 274 grains; hydroquinone, 30 grains; carbonate soda (anhydrous), 150 grains; bromide potassium, 2 grains. For use to each ounce of above add 4 ounces of water; temperature, 65 degrees; time, 12 minutes.

Monomet-Hydro-Pyro (John Boyd).—Monomet, 4 grains; hydroquinone, 4 grains; pyro, 4 grains; metabisulphite potassium, 4 grains; carbonate of soda, anhydrous, 40 grains; sulphite of soda (anhydrous), 60 grains; bromide of potassium, 1 grain; water, 4 ounces. For tank development use 28 ounces of water. Development, 20 minutes at 65 degrees.

Pyro (George D. Jopson).—No. 1. Water, 16 ounces; metabisulphite of potash, 70 grains; pyro, 1 ounce; bromide potassium, 8 grains. Mix in order given. No. 2. Sulphite soda (anhydrous), 60 degrees test. No. 3. Carbonate soda (anhydrous), 40 degrees test. To use, mix 2½ ounces of No. 1, 2 and 3 in rotation, add 57 ounces of water. Develop 20 minutes at 65 degrees.

Rodinal or Activol.—Water, 60 ounces; rodinal or activol, 1 ounce; temperature, 65 degrees; time, 25 minutes.

TRAY DEVELOPERS FOR PLATES AND PAPERS

Amidol. (W. M. Keck).—Amidol, 20 grains; sodium bisulphite (anhydrous), 40 grains; sodium sulphite (dry), 60 grains; potassium bromide (powdered), 1 to 3 grains; water, 4 ounces. For all kinds of developing paper. Expose so that the development will be complete in twenty to thirty seconds. The tone is a blue black.

Amidol Universal Developer. (W. A. Alcock).—Water, 20 ounces; sulphite of soda (anhydrous), ¾ ounce; amidol, 50 grains; potassium bromide, 10 grains; citric acid, 20 to 40 grains. Splendid developer for papers intended for bromoil. Expose so that the image first shows in thirty seconds and develop for four minutes. Gives good tones in hot or cold hypo alum, and nice soft negatives. Splendid in hot weather as it minimizes danger of frilling owing to lack of carbonate.

Adurol. (Hauff). (Anson Herrick).—25 grains; sodium sulphite (anhydrous), 190 grains; hydrochinon, 40 grains; sodium carbonate (anhydrous), 200 grains; potassium bromide (saturated solution); 15 minims; water, 20 ounces.

Diamidophenol. For Paper (Edwin Loker).—Water, 20 ounces; sodium sulphite (anhydrous), 1½ ounces; sodium bisulphite, 10 drams; bromide potassium, 10 grains. To use, take 2 ounces and add 6 grains diamidophenol.

Ferrous Oxalate. For Papers (M. G. Lovelace).—No. 1. Hot water, 1000 CC. Dissolve ferrous sulphate, 250 grams; add slowly sulphuric acid, 3 CC. No. 2. Potassium oxalate (neutral), 250 grams; potassium bromide, 1 gram; hot water to make 1000 CC. Add 1 part of No. 1 to 4 parts of No. 2. After development wash in acetic acid stop bath.

Hydroquinone. (Max Gartner).—Solution No. 1. Water, distilled, 20 ounces; hydroquinone, 160 grains; sodium sulphite (anhydrous), 2 ounces; citric acid, 60 grains; potassium bromide, 40 grains. Solution No. 2, water, distilled, 20 ounces; caustic soda (sticks), 160 grains. For use take No. 1 one part, No. 2 one part, and water two parts.

Hydrochinon.—For over-exposure plates to obtain contrasty negatives (B. H. Allbee).—No. 1, water, 8 ounces; sulphite of soda (anhydrous), ½ ounce; hydrochinon, 80 grains. No. 2, water, 8 ounces; carbonate of soda (anhydrous), 1 ounce; potassium bromide, 40 grains. Take equal parts of No. 1 and No. 2. Temperature, 70 degrees.

Metol (H. W. Hales).—Metol, 60 grains; warm water, 16 ounces; sulphite of soda (anhydrous), ½ ounce; carbonate of soda (anhydrous), ½ ounce. Dissolve metol in warm water, then add the sulphite and carbonate in order named. Cool. Can be used repeatedly. For developing papers add a few drops of 10 per cent solution of bromide of potassium.

Metol-Hydroquinone for Orthochromatic Plates.—Water, 20 ounces; metol, 14 grains; potassium metabisulphite, 18 grains; hydroquinone, 56 grains; sulphide of soda (anhydrous), 1 ounce; carbonate of soda (anhydrous), 1¾ ounces. Use 1 drop of a 10 per cent potassium bromide solution to each ounce only if necessary.

Metol-Hydrochinon. (Lloyd L. Snodgrass).—Water, 1.0 liter or 30 ounces; metol, 1.6 grams, or 22½ grains; sodium sulphite (anhydrous), 240 grams or ¾ ounce; hydrochinon, 6.6 grams or 90 grains; sodium carbonate (anhydrous), 24.0 grams or ¾ ounce. For use dilute with equal quantities of water. Add potassium bromide as needed.

Metol-Hydroquinone. For Paper (M. Gartner).—Water, distilled, 3 ounces; metol, 15 grains; sulphite of soda (anhydrous), 1 ounce; hydroquinone, 60 grains; sodium carbonate (anhydrous), 6 drams (for contrast use 1 ounce); bromide of potassium, 5 grains. Dilute this stock solution with an equal amount of water.

Developer for Commercial Work. (Max Gartner).—Water, distilled, 100 ounces; Ortol, ½ ounce; hydroquinone, 2 ounces; sulphite of soda; (anhydrous), 8 ounces; carbonate of soda (anhydrous), 12 ounces; bromide of potassium, ¼ ounce. For plates use full strength.

Para-Amidophenol. (M. G. Lovelace).—Dissolve 150 grains sulphite soda (anhydrous) in 800 CC. hot water; add 20 grains para-amidophenol; dissolve 8 grains lithium hydrate in 100 CC. water, and add until precipitate formed is dissolved; then add water to make 1000 CC.

Pyro. For Prints (M. G. Lovelace).—No. 1 Pyro, 12 grains; sulphite soda (anhydrous), 80 grams; potassium ferrocyanide, 2 grams; water, 500 CC. No. 2 Sodium hydrate, 4 grams; water, 500 CC. To use, one part each with water 2 parts. Add 3 drops saturated solution bromide of potassium to every 400 CC. of developer.

Pyro. For Night Subjects (Robert Dykes).—Stock solution—Pyro, 1 ounce; potassium bromide, 60 grains; potassium metabisulphite, 50 grains; distilled water to make 12 ounces. No. 1. Take stock solution 3 ounces, add 2 ounces boiled water. No. 2. Sulphite soda (anhydrous), 1 ounce; carbonate soda (anhydrous), 1 ounce; water (boiled) to make 20 ounces. For use, 4 drams No. 1 to 5 drams No. 2 in 16 ounces of water.

Pyro. For Overtimed Plates (J. D. Elliott).—Sulphite soda (anhydrous), 40 degrees solution, 4 ounces; water, 4 ounces; pyro, 10 grains. Immerse plates in this solution for 20 minutes in the dark; then add to above solution ½ dram carbonate soda (anhydrous), 20 degrees solution. When image appears add one more dram of the carbonate soda solution.

Pyro Tray Film Developer. (J. E. Carson).—No. 1 solution, boiled water or rain water, 8 ounces or 240 C.C.s; potassium metabisulphite, 60 grains or 3.55 grams; pyro, 120 grains or 7.10 grams. No. 2 stock solution; boiled or rain water, 8 ounces or 240 C.C.s; sulphite soda anhydrous, 328 grains or 21½ grams; carbonate soda, 219 grains, or 14¼ grams. For developing use half ounce or 15 cubic centimeters of each solution, and 4 ounces or 120 C.C.s water. Develop for five minutes at 65 degrees.

Pyro-Metol. For plates (H. M. Long).—A. Water, 22½ ounces; metabisulphite, 2 drams; metol, 60 grains; pyro, 1 ounce. B. Water, 16 ounces; sulphite soda (anhydrous), 2 ounces. C. Water, 16 ounces; carbonate soda (anhydrous), 1 ounce. Normally used 1 ounce of each stock to 16 of water.

DEVELOPERS FOR LANTERN SLIDES

Hydroquinone (B. H. Allbee).—No. 1. Hydroquinone, 150 grains; metabisulphite potash, 10 grains; bromide potassium, 50 grains; water, 20 ounces. No. 2. Sulphite of soda (anhydrous), 1 ounce; caustic soda, 100 grains; water, 20 ounces. Take equal parts of No. 1 and No. 2.

Hydroquinone. One Solution for Warm Tones (A. H. Farrow). Hydroquinone, 1 dram; sulphite of soda (anhydrous), 2 drams; carbonate of soda (anhydrous), 4 drams; bromide of potassium, 20 grains; water, 12 ounces.

Hydroquinone. For Colder Tones (B. H. Allbee).—No. 1. Hydroquinone, 60 grains; sulphite of soda (anhydrous), 1 ounce; citric acid, 10 grains; bromide potassium, 10 grains; water, 10 ounces. No. 2. Carbonate of soda (anhydrous), 1 ounce; water, 10 ounces. Use equal parts.

FIXING BATHS AND HARDENERS

Fixing and Hardening Bath. For Plates, Films and Papers. (W. A. Alcock).—In hot weather, hypo, 1 pound; epsom salts, 1 pound; water, 100 ounces. In cold weather, hypo, 1 pound; epsom salts, ½ pound; water, 100 ounces.

Acid Fixing Bath (W. Wynne Bolton).—Water, 80 ounces; hypo crystals, 24 ounces; sulphite of soda crystals, 8 ounces; alum (chrome). 4 ounces; acetic acid, 6 ounces. Dissolve chemicals in order named. Will keep from three to six months in a cool place to use over and over.

Acid Fixing Bath (Carbutt).—Sulphuric acid, 1 dram; sodium hyposulphite, 16 ounces; sulphite of soda (anhydrous), 2 ounces; chrome alum, 1 ounce; warm water, 64 ounces. To prepare the bath, dissolve the hypo in 48 ounces of water, the sulphite of soda in 6 ounces; mix the sulphuric acid with 2 ounces of the water and pour slowly into the sulphite solution and then add to the hypo solution. Dissolve the chrome alum in 8 ounces of water; add to the bulk of the solution and the bath is ready for use.

Fixing Bath for Lantern Slides (B. H. Allbee).—Sulphuric acid, 1 dram; hypo, 16 ounces; sulphite of soda (anhydrous), 1 ounce; chrome alum, 1 ounce; water, 64 ounces.

Plain Fixing Bath.—Dissolve 1 pound of sodium hyposulphite in 2 quarts of water, or 4 ounces of the hypo in a pint of water, according to the bulk of the solution required.

Hardener for Fixing Bath (Beach).—Water, 40 ounces; sulphite of soda (anhydrous), 3 ounces; powdered alum, 16 ounces; acetic acid, 40 ounces. Add in the order given and shake well until dissolved. Of the above add 16 ounces to each gallon of hyposulphite of soda solution, testing 70 to 80 degrees.

Hardening Negatives.—Immerse them for a few minutes in formalin, 1 ounce; water, 30 ounces.

Short Stop removes developer stains; renders an acid fixing bath unnecessary when making D. O. P. or bromide prints, and destroys stains on both prints and fingers. (J. E. Carson).—Potassium metabisulphite, 1 ounce or 30 C.C.s; water, 32 ounces, or 960 C.C.s. When thoroughly dissolved add 10 drops C. P. sulphuric acid. This bath should have a light sulphur dioxide odor after standing awhile. If not, add acid drop by drop until odor appears.

INTENSIFICATION

Intensifier, One Solution (F. M. Steadman).—No. 1. Bichloride of mercury, ½ ounce; water, 10 ounces. No. 2. Iodide of potassium, 5 drams; water, 1½ ounces. Add to No. 1. No. 3. Hyposulphite of soda, 1 ounce; water, 2½ ounces. Add to the previous mixture. This clears the solution when it is ready for use for local intensification. For tray intensification add more water to slow its action.

Intensifying with Red Ink (E. M. Cohen).—Soak the negative well. Put teaspoon of red ink into tray of water and rock until mixed. Immerse negatives face up till well and evenly colored, then without washing put in drying frame. If left in solution too long will be over dense, in which case several trays of clear water will eliminate some of the color.

The intensification is permanent without the danger of negative going bad, as is the case when mercury is used.

Intensifier—Mercuric Chloride Process.—No. 1. Mercuric chloride, 200 grains; bromide of potassium, 120 grains; water, 6½ ounces. No. 2. Sulphite of soda (anhydrous), 1 ounce; water, 4 ounces. The well-washed negative, free from hypo, must be thoroughly bleached in No. 1; well washed; and then blackened in No. 2. After blackening, it is well washed again.

Intensifier. (Monckhoven's).—A. Potassium bromide, ¾ ounce or 25 grams; bichloride of mercury, ¾ ounce or 25 grams; water, to 32 ounces or 1 liter. B. Potassium or sodium cyanide, ½ ounce or 25 grams; silver nitrate, ¾ ounce or 25 grams; water, to 32 ounces or 1 liter. In making up the intensifier the B solution requires care and must be made as follows: The cyanide and the silver are dissolved in separate halves of water, and the silver solution is then added to the cyanide solution until the precipitate formed no longer dissolves; that is to say, there must be a little precipitate left. The negative is placed in A until it is thoroughly bleached. It is washed for at least two minutes and placed in solution B to blacken.

REDUCTION

Reducer, Single Solution (F. M. Steadman).—Red prussiate of potash, size of pea; hyposulphite of soda, six times that volume; water, 6 ounces (for local reduction, 1½ ounces). When reduced wash thoroughly.

Reducer—Ammonium Persulphate.—Ammonium persulphate, 15 grains; water, 1 ounce. The solution should be made just before use. The negative must be perfectly free from hypo, or it will be stained by the persulphate. When the desired reduction has been reached, transfer the negative without washing to a 10 per cent solution of anhydrous sodium sulphite. Wash finally for 15 or 20 minutes.

Reducer—Farmer's.—Dissolve 1 ounce of potassium ferricyanide in 9 ounces of water and make up to 10 ounces, forming a 10 per cent solution. Label this poison. Thoroughly wet the negative to be reduced. Take enough fresh plain hypo, fixing bath for the purpose, and add to it enough of the ferricyanide solution to make it a light straw color. The negative to be reduced is immersed in this solution, when it will be seen to lose density. Rock the tray to insure evenness of action. This reducer can also be used for local treatment.

PRINTING PROCESSES

Blue Prints

Blue Printing Sensitizing Formulæ (Brown).—A. Dissolve 110 grains ferric ammonium citrate (green) in 1 ounce of water. B. Dissolve 40 grains of potassium ferricyanide in 1 ounce of water. These two solutions are made up separately. They are then mixed together and kept in a stoneware bottle, but the single solution should always be filtered before use. The mixture will retain its good qualities for months if kept from the light.

(Millen).—Potassium ferricyanide, 1 ounce; ammonio-citrate of iron 1½ ounces; distilled water, 10 ounces. Mix thoroughly and filter. The solution should have a deep wine color and dry on the paper a lemon-yellow. If the solution is green and has a precipitate, the ammonio-citrate is old and spoiled. The mixture should be kept from the light.

Bromide Paper

Bromide Paper Developers: Hydroquinone-metol. No. 1. Water, 10 ounces; hydroquinone, 52 grains; potassium metabisulphite, 18 grains; sulphite of soda (anhydrous), 5 drams; carbonate of soda (anhydrous), 1¼ ounces. No. 2. Water, 10 ounces; metol, 30 grains; carbonate of soda, 5 drams; sulphite of soda (anhydrous), 5 drams. One or two drops of a potassium bromide 10 per cent solution added to 1 ounce of the mixed developer will increase contrast and keep the whites pure. Equal parts of 1 and 2 give excellent prints from a normal negative; one part of 1 and two of 2 give gray prints with maximum half-tone and gradation; two parts of 1 and one of 2 give vigorous prints from soft delicate negatives.

Amidol for rich blacks (freshly prepared). Distilled (or boiled) water, 4 ounces; sulphite of soda (anhydrous) 45 grains; amidol, 10 to 15 grains. Add a drop of 10 per cent bromide solution to each ounce of developer.

Sepia Tones: Hypo Alum.—Hyposulphite of soda, 5 ounces; ground alum, 1 ounce; boiling water, 70 ounces. Dissolve the hypo in the water and then add the alum slowly. A milk-white solution results which should be decanted when clear. It is not used until cold (about 60 degrees Fahr.).

Sepia Tones: Sulphide of Sodium.—The fixed and washed print is treated with one of the following solutions: (1) Potassium ferricyanide, 10 grains; potassium bromide, 10 grains; water, 1 ounce; or (2) potassium ferricyanide, 20 grains; sodium chloride (common salt), 30 grains; water, 1 ounce. The image will be bleached by either of these solutions in a few minutes, the whitish appearance of the deposit being caused by its change into a salt of silver. After 5 minutes in running water apply the sulphuretting solution: Dissolve 3 ounces of sodium monosulphide in 15 ounces of water; boil the solution for about 10 minutes, filter off the black precipitate formed, and when cooled make up to 25 ounces with water. To tone take of the sulphide solution 1 ounce and add water 12 to 20 ounces.

Red Tones: Copper.—Dissolve 100 grains of ammonium carbonate in 2 ounces of water, and in this solution dissolve 10 grains of sulphate of copper. Then add 20 grains of potassium ferricyanide. A clear, dark green solution results, which gives a red-chalk tone in about 3 minutes. Tone until the deepest shadow is converted, and then wash the print for 10 minutes.

Green Tones: Vanadium.—Bleach print in the following: Potassium ferricyanide, 10 grains; ammonium carbonate, 100 grains; water, 1 ounce. Wash well and apply: Ferric chloride, 2 grains; vanadium chloride, 2 grains; ammonium chloride, 4 grains; hydrochloric acid, 5 minims; water, 1 ounce.

Blue Tones: Iron—Bleach print in: Potassium ferricyanide, 10 grains; ammonium carbonate, 100 grains; water, 1 ounce; then tone in ferric chloride, 5 grains; hydrochloric acid, 5 minims; water, 1 ounce.

To prevent blistering on bromide paper (P. L. Anderson).—Immerse after fixing and before washing from 10 to 15 minutes in water, 10 ounces; formaldehyde, 1 ounce. A 10 per cent solution of chrome alum will do equally well.

To make bromide paper translucent (P. L. Anderson).—Lay the paper negative face down on a blotter and paint thinly with the following mixture. Give three coats. Turpentine, 3 ounces; powdered resin, 1 ounce; gum elemi, 1 ounce; paraffine wax, ½ ounce. Heat with stirring until it begins to boil. Allow to cool slightly and add turpentine, 3 ounces.

Carbon Tissue

Carbon Tissue, Sensitizer for (Bennett).—Potassium bichromate, 4 drams; citric acid, 1 dram; strong ammonia water, about 3 drams; water, 25 ounces; dissolve the bichromate and citric acid in hot water, and add sufficient ammonia to change the orange color of the solution to lemon-yellow. Sensitize for 90 seconds; reducing the water softens the gradation in the print; increasing it to 30 ounces gives more vigor.

Carbon Lantern Slides.—Prepare the glass by coating with the following preparation: 180 grains of Nelson's Gelatine No. 1, in 20 ounces water. Add 10 grains bichromate of potash. Dry and allow the plate to be exposed to light for a couple of days to make the coating thoroughly insoluble. Sensitizer for tissue: 1 per cent to 1¼ per cent solution of bichromate of potash. Immerse 2 minutes. Print deeply; expose twice as long as ordinary paper print. Develop in hot water as usual.

Gum Bichromate

Gum Bichromate (Casper Millar). A.—Gum arabic, 1¼ ounces; water, 3½ ounces; salicylic acid, 4 grains.

B.—Chrome alum, 45 grains; water, 3½ ounces. Grind A and B with water and pigment, brush over paper, dry and store.

Suggested formula.—A, 2 ounces; B, 1½ drams; carbon black, 10 grains; sensitize for 2 minutes in 5 per cent bichromate solution.

Kallitype

Kallitype Sensitizer for Black Tones (J. Thomson).—Distilled water, 1 ounce; ferric oxalate (Merck's or Mallinckrodt's), 15 grains; citrate of iron and ammonia (brown scales), 25 grains; chloride of copper, 8 grains; oxalate of potassium, 35 grains; oxalic acid, 15 grains; silver nitrate, 15 grains; gum arabic, 10 grains. For greater contrast add 1 to 10 drops 5 per cent bichromate of potassium solution.

Developer: Stock Solution.—Distilled water, 1 ounce; silver nitrate, 40 grains; citric acid, 10 grains; oxalic acid, 10 grains. Filter. Normal developer 1 dram stock solution and 7 drams of water.

Platinum Papers

Platinum Sensitizer (P. L. Anderson).—Stock solutions: I. Water, hot, distilled, 2 ounces; ferric oxalate, 240 grains; oxalic acid, 16 grains. II. Water, hot, distilled, 2 ounces; ferric oxalate, 240 grains; oxalic acid, 16 grains; potassium chlorate, 4 grains. III. Water, distilled, 19 drams; potassium chloroplatinite, 219 grains (=½ ounce). Keep in amber glass bottles or in the dark. For use take: I, 22 mm.; II, 0 mm.; III, 24 mm. Gives very soft prints. Or I, 12 mm.; II, 10 mm.; III, 24 mm. Results about the same contrast as a P. O. P. print. Or I, 0 mm.; II, 22 mm.; III, 24 mm. Gives extreme contrast.

Above quantities sufficient for a 10 x 12 sheet of ordinary paper. Very smooth requires less and very rough more, up to 25 per cent additional. Apply with a soft fitch or camel-hair brush, allow to surface dry, and make bone-dry over a stove or gas jet. Should dry in not less than five or more than ten minutes.

Platinum: Sensitizing, Gold Bath and Sepia Papers. A.—Chloroplatinite of potassium, 15 grains; distilled water, 90 minims.

B.—Ferric oxalate, 21 grains; oxalic acid, 2 grains; distilled water, 183 minims. For cold bath paper, mix A and B, and add 15 minims of water. For sepia paper mix A and B and add 15 minims of a 5 per cent solution of mercuric chloride. The addition of a few grains of potassium chlorate to any of the above gives increased contrast in the print. From 140 to 170 minims of solution are sufficient to coat a sheet of paper 20 x 26 inches.

Platinum Prints: to Intensify. A.—Sodium formate, 45 grains; water, 1 ounce.

B.—Platinum perchloride, 10 grains; water, 1 ounce.

C.—For use, take 15 minims each of A and B to 2 ounces of water. Immerse prints until sufficiently intensified, then remove and wash.

Platinum Prints to Distinguish from Bromide.—Soak the print in saturated solution of mercuric chloride; a platinum print will not change; a bromide print will bleach.

Salted Papers

Salted Paper Prints: Sensitized with the following: Silver, 480 grains Troy; water, 11 ounces. Dissolve and pour off 2 ounces, and to the 9 ounces left add strong aqua ammonia to form a precipitate and redissolve the precipitate, then add the remaining 2 ounces which will form another precipitate; to this add 9 drops of nitric acid C. P. Apply this to the paper with a tuft of cotton.

Any good toning bath will give good results, such as—Chloride aluminum, 80 grains; bicarbonate soda (anhydrous), 360 grains; water, 48 ounces. When mixed this will form a flaky hydrate which will settle to the bottom. It can be strained through clean washed muslin. To prepare a small bath for toning, take 12 ounces of the stock solution and add sufficient gold to tone in 8 to 10 minutes. The gold solution must be neutralized with bicarbonate soda (anhydrous) before adding to the above bath. When the prints reach the desired tone, throw them into a bath of salt water, made of water, 1 gallon, table salt, 1 ounce.

Printing Out Papers

Gold Toning (B. H. Allbee).—No. 1, 10 per cent solution sulphocyanide of potassium; No. 2, 15 grains chloride of gold in 7½ ounces of water; No. 3, 10 per cent solution phosphate of soda; No. 4, saturated solution borax. Take No. 1, 1 dram; water, 8 drams; No. 2, 4 drams; No. 3, 1 dram; No. 4, 2 drams. In this put print in dry. Toning should be complete in two minutes. Wash as usual.

Gold Toning.—For blue-black tones, for slight strengthening, and for converting rusty black into pure black. Soak prints in warm water, lay on warm glass, brush over glycerine and blot off. Pour on few minims of solution of gold chloride (1 grain per dram), and rapidly brush in all directions. When toned, rinse and sponge back and front with: Metol, 50 grains; sodium sulphite, 1 ounce; potassium carbonate, ½ ounce; water, 20 ounces. Tone in daylight. Do not tone sepias or old prints in this solution.

Gold Toning—To Give Black Tones (A. B. Klugh.)—Solution A. Sodium thiosulphate (hypo), 40 grams; water, 100 cc. Solution B. Lead nitrate, 5 grams; acetic acid, glacial, 5 cc.; water, 50 cc. Add to solution A enough of B to produce a slight milkiness. Filter and add 25 cc. of a 1% solution of gold chloride. Print deeply and tone until a warm black is produced.

Gold Toning Bath. (Alfred J. Jarman).—Filtered water, 30 oz. fluid; acetate of soda, 2 drams; bicarbonate of soda (anhydrous), 20 grains; chloride of gold, 4 grains.

MISCELLANÆ

Adhesive for Labels.—Soak 1 part of the best glue in water until thoroughly swollen, add a little sugar candy, 1 part of gum arabic and 6 parts of water. Boil with constant stirring over a spirit lamp until the whole gets thin. Coat sheets of paper with it; let dry and cut up into convenient sizes.

Blackening Mixture.—Dissolve a 4-ounce stick of licorice in 8 ounces of water with the aid of gentle heat. When dissolved rub into the mixture 1 ounce of burnt sienna in powder, using the back of a spoon for this purpose. When cold, bottle for use.

Bleaching Solution.—(Alfred J. Jarman). Water (ordinary), 20 oz. fluid, bichloride of mercury, 1 oz. fluid, potassium bromide, ¾ oz. fluid. Dissolve and filter the solution.

Cleaning Greasy Bottles.—Wash with benzine, or permanganate of potassium, to which has been added some hydrochloric acid.

Bottles that have contained resinous substances, wash with potash or soda and rinse with alcohol. Bottles that have contained essences, wash with sulphuric acid, then with water.

Clearing Stained Negatives.—Dissolve ⅛ ounce of pulverized alum in 20 ounces of water and add 1 dram of sulphuric acid. Immerse the stained plate in this solution for a few minutes; remove plate wash and then set in the rack to dry.

Film: to Remove from Glass: Make two solutions. A.—Sodium flouride, 6 grains; water, 4 ounces.

B.—Sulphuric acid, 6 drops; water, 1 ounce. Place the negative in solution A for 2 minutes and then place directly in solution B. After another 2 minutes lift the film with the finger from one corner of the plate. It will soon leave the glass.

Firelight Effects on Developing Paper (H. S. Hood). No. 1.—Water, 5 drams; copper sulphate, 10 per cent solution, 15 minims; ammonium carbonate, 10 per cent solution. Add till precipitate first formed is redissolved.

No. 2—Water, 4½ ounces; potassium ferricyanide, 6/10 drams. Mix separately and add No. 2 to No. 1. The print will turn bright red. Wash well.

Ground Glass: Substitutes for. 1.—Paraffine wax makes an excellent substitute for ground glass if the latter should get broken. Iron the paper onto a sheet of plain glass. It is more transparent than the focusing screen, and the image will appear clearer; hence, in exposing allowance must be made for the difference in illumination.

2.—Resin dissolved in wood alcohol and blown over the glass; this must not be scratched; it gives a very fine-grained ground glass effect.

3.—White wax, 120 grains; ether, 1 ounce.

Ground Glass Varnish: Sandarac, 90 grains; mastic, 20 grains; ether, 2 ounces. Dissolve the resins in the ether and add benzole ½ to 1½ ounces.

Lens: to Clean.—The lens should always be kept free from dust or other impurities. To clean it, spread upon a table a clean sheet of paper; take the lens apart, and with a camel-hair brush dust each of the combinations on both sides. If the surfaces of the lenses are very dirty and have lost their polish, make up the following: Nitric acid, 3 drops; alcohol, 1 ounce; distilled water, 2 ounces. Dip a tuft of filtering cotton in this solution, rub each side of the lens, then polish with an absolutely clean chamois. Clean the lens tube before replacing the lenses, each of which should be finally dusted with a camel-hair brush.

Mounting Without Cockling (W. S. Davis).—Coat back of dry print with as strong a solution of warm gelatine (pure table gelatine will do) as can be spread easily. Allow to dry, then attach to mount by dampening the mount with water, then lay print in desired position; cover with a sheet of bond or smooth paper, and apply a warm flat iron until the gelatine melts. Very effective for thin mounting material, as there is no cockling if the mount contains just the right amount of water.

Paste, Starch (A. Lomax).—Powdered starch, 1 ounce; cold water, 12 ounces. Mix smooth with a glass rod, heat to boiling point. Boil half a minute stirring all the time. Use cold.

Poisons and Antidotes.—Administer the antidote as soon as possible. If a strong acid or alkali, or cyanide of potassium, has been swallowed, lukewarm water in large quantities should be swallowed at once. Where strong acids or alkalies have not been swallowed, rid the stomach of the poison by vomiting; for this purpose take 25 grains of zinc sulphate in warm water.

Polished surfaces: to Photograph.—Smear the surface with soft putty so as to deaden the reflections. Photograph the article against a black background and stop off all reflections, allowing the light to come from one direction only. To photograph hollow cut glassware, fill with ink or aniline black water dye. Before photographing machinery deaden the bright parts with putty.

Stains: to Remove from the Hands.—Developer stains: solution of citric or oxalic acid. Silver nitrate stains: Water, 4 ounces; chloride of lime, 350 grains; sulphate of soda, 1 ounce. Apply with a brush.

Test for Hypo: Potassium permanganate, 2 grains; potassium carbonate, 20 grains; distilled water, 40 ounces. Soak the plate or print to be treated in water for one hour, then remove and add to the water a few drops of the above solution, which will turn a greenish yellow or brown if the water is not free from hypo.

COMPARISON OF VALUES

COMPILED BY CHAS. LE B. GOELLER

Taking for a standard f.8 as a unit of measurement.

Speed increased.	Opening twice as fast.					
f:8 = 1	Twice as fast	as	f:11.3	exposure	1	sec.
7.5 = 1⅛	“	as	10.6	“	0.88	“
6.8 = 1⅜	“	as	9.6	“	0.725	“
6.3 = 1 3–5	“	as	8.8	“	0.625	“
6. = 1 7–9	“	as	8.5	“	0.5625	“
5.6 = 2	“	as	8	“	0.5	“
4.5 = 3 1–6	“	as	6.3	“	0.3125	“

UNITED STATES WEIGHTS AND MEASURES

According to Existing Standards

LINEAR

12 inches = 1 foot.
3 feet = 1 yard.
5.5 yards = 1 rod.
40 rods = 1 furlong.
8 furlongs = 1 mile.

Inches		Feet		Yards		Rods		Fur's		Mi.
12	=	1								
36	=	3	=	1						
198	=	16.5	=	5.5	=	1				
7,920	=	660	=	220	=	40	=	1		
63,360	=	5,280	=	1,760	=	320	=	8	=	1

SURFACE—LAND

144 sq. ins. = 1 sq. ft.
9 sq. ft. = 1 sq. yd.
30.25 sq. yds. = 1 sq. rod.
40 sq. rods = 1 sq. rood.
4 sq. roods = 1 acre.
640 acres = 1 sq. mile.

Feet		Yards		Rods		Roods		Acres
9	=	1						
272.25	=	30.25	=	1				
10,890	=	1,210	=	40	=	1		
43,560	=	4,840	=	160	=	4	=	1
27,878,400	=	3,097,600	=	102,400	=	2,560	=	640

VOLUME—LIQUID

4 gills = 1 pint.
2 pints = 1 quart.
4 quarts = 1 gallon.

Gills		Pints		Gallon		Cub. In.
32	=	8	=	1	=	231

FLUID

Gallon		Pints		Ounces		Drachms		Minims		Cubic Centimetres
1	=	8	=	128	=	1,024	=	61,440	=	3,785,435
		1	=	16	=	128	=	7,680	=	473,179
				1	=	8	=	480	=	29,574
						1	=	60	=	3,697

16 ounces, or a pint, is sometimes called a fluid pound.

TROY WEIGHT

Pound		Ounces		Pennyweights		Grains		Grams
1	=	12	=	240	=	5,760	=	373.24
		1	=	20	=	480	=	31.10
				1	=	24	=	1.56

APOTHECARIES' WEIGHT

lb. Pound		℥ Ounces		ʒ Drachms		℈ Scruples		gr. Grains		Grams
1	=	12	=	96	=	288	=	5,760	=	373.24
		1	=	8	=	24	=	480	=	31.10
				1	=	3	=	60	=	3.89
						1	=	20	=	1.30
								1	=	.06

The pound, ounce, and grain are the same as in Troy weight.

AVOIRDUPOIS WEIGHT

Pound		Ounces		Drachms		Grains (Troy)		Grams
1	=	16	=	256	=	7,000	=	453.60
		1	=	16	=	437.5	=	28.35
				1	=	27.34	=	1.77

ENGLISH WEIGHTS AND MEASURES

APOTHECARIES' WEIGHT

20 Grains = 1 Scruple = 20 Grains.
3 Scruples = 1 Drachm = 60 Grains.
8 Drachms = 1 Ounce = 480 Grains.
12 Ounces = 1 Pound = 5,760 Grains.

FLUID MEASURE

60 Minims = 1 Fluid Drachm
8 Drachms = 1 Fluid Ounce
20 Ounces = 1 Pint
8 Pints = 1 Gallon

The above weights are usually adopted in formulas.

All Chemicals are usually sold by

AVOIRDUPOIS WEIGHT

$27\frac{11}{32}$ Grains = 1 Drachm = $27\frac{11}{32}$ Grains
16 Drachms = 1 Ounce = 437½ Grains
16 Ounces = 1 Pound = 7,000 Grains

Precious Metals are usually sold by

TROY WEIGHT

24 Grains = 1 Pennyweight = 24 Grains
20 Pennyweights = 1 Ounce = 480 Grains
12 Ounces = 1 Pound = 5,760 Grains

NOTE.—An ounce of metallic silver contains 480 grains, but an ounce of nitrate of silver contains only 437½ grains.

UNITED STATES FLUID MEASURE

Gal.	Pints.	Ounces.	Drachms.	Mins.	Cub. In.	Grains.	Cub. C.M.
1	= 8	= 128	= 1,024	= 61,440	= 231.	= 58,328.886	= 3,785.44
	1	= 16	= 128	= 7,680	= 28.875	= 7,291.1107	= 473.18
		1	= 8	= 480	= 1.8047	= 455.6944	= 29.57
			1	= 60	= 0.2256	= 56.9618	= 3.70

IMPERIAL BRITISH FLUID MEASURE

Gal.	Pints.	Ounces.	Drachms.	Mins.	Cub. In.	Grains.	Cub. C.M
1	= 8	= 160	= 1,280	= 76,800	= 277.27384	= 70,000	= 4,543.732
	1	= 20	= 160	= 9,600	= 34.65923	= 8,750	= 567.966
		1	= 8	= 480	= 1.73296	= 437.5	= 28.398
			1	= 60	= 0.21662	= 54.69	= 3.550

METRIC SYSTEM OF WEIGHTS AND MEASURES

MEASURES OF LENGTH

Denominations and Values		Equivalents in Use	
Myriameter	10,000 meters.	6.2137	miles.
Kilometer	1,000 meters.	.62137	mile, or 3,280 ft. 10 ins.
Hectometer	100 meters.	328.	feet and 1 inch.
Dekameter	10 meters.	393.7	inches.
Meter	1 meter.	39.37	inches.
Decimeter	1-10th of a meter.	3.937	inches.
Centimeter	1-100th of a meter.	.3937	inch.
Millimeter	1-1000th of a meter.	.0394	inch.

MEASURES OF SURFACE

Denominations and Values		Equivalents in Use	
Hectare	10,000 square meters.	2.471	acres.
Are	100 square meters.	119.6	square yards.
Centare	1 square meter.	1,550.	square inches.

MEASURES OF VOLUME

Denominations and Values			Equivalents in Use	
Names	No. of Liters	Cubic Measures	Dry Measure	Wine Measure
Kiloliter or stere	1,000	1 cubic meter.	1.308 cubic yards.	264.17 gallons.
Hectoliter	100	1-10th cubic meter.	2 bu. and 3.35 pecks.	26.417 gallons.
Dekaliter	10	10 cubic decimeters.	9.08 quarts.	2.6417 gallons.
Liter	1	1 cubic decimeter.	.908 quart.	1.0567 quarts.
Deciliter	1–10	1-10th cubic decimeter.	6.1023 cubic inches.	.845 gill.
Centiliter	1–100	10 cubic centimeters	.6102 cubic inch.	.338 fluid oz.
Milliliter	1–1000	1 cubic centimeter.	.061 cubic inch.	.27 fl. drm.

WEIGHTS

Denominations and Values			Equivalents in Use
Names	Number of Grams	Weight of Volume of Water at its Maximum Density	Avoirdupois Weight
Millier or Tonneau	1,000,000	1 cubic meter.	2204.6 pounds.
Quintal	100,000	1 hectoliter.	220.46 pounds.
Myriagram	10,000	10 liters.	22.046 pounds.
Kilogram or Kilo	1,000	1 liter.	2.2046 pounds
Hectogram	100	1 deciliter.	3.5274 ounces.
Dekagram	10	10 cubic centimeters.	.3527 ounce.
Gram	1	1 cubic centimeter.	15.432 grains.
Decigram	1–10	1-10th of a cubic centimeter.	1.5432 grain.
Centigram	1–100	10 cubic millimeters.	.1543 grain.
Milligram	1–1000	1 cubic millimeter.	.0154 grain.

For measuring surfaces, the square dekameter is used under the term of ARE; the hectare, or 100 ares, is equal to about 2½ acres. *The unit of capacity* is the cubic decimeter or LITER, and the series of measures is formed in the same way as in the case of the table of lengths. The cubic meter is the unit of measure for solid bodies, and is termed STERE. *The unit of weight* is the GRAM, which is the weight of one cubic centimeter of pure water weighed in a vacuum at the temperature of 4 deg. Cent. or 39.2 deg. Fahr., which is about its temperature of maximum density. In practice, the term cubic centimeter, abbreviated c.c., is generally used instead of milliliter, and cubic meter instead of kiloliter.

THE CONVERSION OF FRENCH (METRIC) INTO ENGLISH MEASURE

1 cubic centimeter	=	17 minims					
2 cubic centimeters	=	34 “					
3 “	=	51 “					
4 “	=	68 “	or	1 dram	8 minims		
5 “	=	85 “	“	1 “	25 “		
6 “	=	101 “	“	1 “	41 “		
7 “	=	118 “	“	1 “	58 “		
8 “	=	135 “	“	2 drams	15 “		
9 “	=	152 “	“	2 “	32 “		
10 “	=	169 “	“	2 “	49 “		
20 “	=	338 “	“	5 “	38 “		
30 “	=	507 “	“	1 ounce	0 dram	27 minims	
40 “	=	676 “	“	1 “	3 drams	16 “	
50 “	=	845 “	“	1 “	6 “	5 “	
60 “	=	1014 “	“	2 ounces	0 “	54 “	
70 “	=	1183 “	“	2 “	3 “	43 “	
80 “	=	1352 “	“	2 “	6 “	32 “	
90 “	=	1521 “	“	3 “	1 “	21 “	
100 “	=	1690 “	“	3 “	4 “	10 “	
1000 “	=	1 liter =		35 “	1 “	40 “	

THE CONVERSION OF FRENCH (METRIC) INTO ENGLISH WEIGHT

The following table, which contains no error greater than one-tenth of a grain, will suffice for most practical purposes.

1 gram	=	15⅖ grains.			
2 grams	=	30⅘ “			
3 “	=	46⅕ “			
4 “	=	61⅘ “	..................or	1 dram	1⅘ grain
5 “	=	77⅕ “	..................“	1 “	17⅕ grains
6 “	=	92⅗ “	..................“	1 “	32⅗ “
7 “	=	108 “	..................“	1 “	48 “
8 “	=	123⅖ “	..................“	2 drams	3⅖ “
9 “	=	138⅘ “	..................“	2 “	18⅘ “
10 “	=	154⅖ “	..................“	2 “	34⅖ “
11 “	=	169⅘ “	..................“	2 “	49⅘ “
12 “	=	185⅕ “	..................“	3 “	5⅕ “
13 “	=	200⅗ “	..................“	3 “	20⅗ “
14 “	=	216 “	..................“	3 “	36 “
15 “	=	231⅖ “	..................“	3 “	51⅖ “
16 “	=	247 “	..................“	4 “	7 “
17 “	=	262⅖ “	..................“	4 “	22⅖ “
18 “	=	277⅘ “	..................“	4 “	37⅘ “
19 “	=	293⅕ “	..................“	4 “	53⅕ “
20 “	=	308⅗ “	..................“	5 “	8⅗ “
30 “	=	463 “	..................“	7 “	43 “
40 “	=	617⅕ “	..................“	10 “	17⅕ “
50 “	=	771⅗ “	..................“	12 “	51⅗ “
60 “	=	926 “	..................“	15 “	26 “
70 “	=	1080⅕ “	..................“	18 “	0⅕ “
80 “	=	1234⅗ “	..................“	20 “	34⅗ “
90 “	=	1389 “	..................“	23 “	9 “
100 “	=	1543⅕ “	..................“	25 “	43⅕ “
1000 “	=	1 kilogram = 32 oz., 1 dr., 12⅖ gr.			

THE ELEMENTS:

THEIR NAMES, SYMBOLS, AND ATOMIC WEIGHTS OXYGEN STANDARD.

Compiled by HENRY F. RAESS.

1915

Aluminum..Al	27.10
Antimony..Sb	120.20
Argon......A	39.88
Arsenic....As	74.96
Barium....Ba	137.37
Bismuth....Bi	208.00
Boron......B	11.00
Bromine....Br	79.92
Cadmium...Cd	112.40
Caesium....Cs	132.81
Calcium....Ca	40.07
Carbon....C	12.00
Cerium....Ce	140.25
Chlorine....Cl	35.46
Chromium..Cr	52.00
Cobalt.....Co	58.97
Columbium.Cb	93.50
Copper.....Cu	63.57
Dysprosium Dy	162.50
Erbium....Er	167.70
Europium..Eu	152.00
Fluorine....F	19.00
Gadolinium.Gd	157.30
Gallium....Ga	69.90
Germanium.Ge	72.50
Glucinum...Gl	9.10
Gold........Au	197.20
Helium.....He	3.96
Holmium.....Ho	163.50
Hydrogen....H	1.008
Indium.......In	114.80
Iodine........I	126.92
Iridium.......Ir	193.10
Iron..........Fe	55.84
Krypton.......Kr	82.92
Lanthanum...La	139.00
Lead..........Pb	207.10
Lithium.......Li	6.94
Lutecium.....Lu	174.00
Magnesium...Mg	24.32
Manganese...Mn	54.93
Mercury.....Hg	200.60
Molybdenum . Mo	96.00
Neodymium..Nd	144.30
Neon.........Ne	20.20
Nickel........Ni	58.68
Niton.........Nt	222.40
Nitrogen.....N	14.01
Osmium.......Os	190.90
Oxygen.......O	16.00
Palladium....Pd	106.70
Phosphorus ..P	31.04
Platinum.....Pt	195.20
Potassium....K	39.10
PraseodymiumPr	140.60
Radium.......Ra	226.40
Rhodium....Rh	102.90
Rubidium...Rb	85.45
Ruthenium..Ru	101.70
Samarium...Sa	150.40
Scandium....Sc	44.10
Selenium....Se	79.20
Silicon......Si	28.30
Silver........Ag	107.88
Sodium......Na	23.00
Strontium...Sr	87.63
Sulphur.....S	32.07
Tantalum...Ta	181.50
Tellurium...Te	127.50
Terbium....Tb	159.20
Thallium....Tl	204.00
Thorium....Th	232.40
Thulium....Tm	168.50
Tin..........Sn	119.00
Titanium....Ti	48.10
Tungsten....W	184.00
Uranium....U	238.50
Vanadium...V	51.00
Xenon.......Xe	130.20
Ytterbium...Yb	173.50
Yttrium.....Yt	89.00
Zinc.........Zn	65.37
Zirconium...Zr	90.60

TABLE OF COMPARATIVE PLATE SPEED NUMBERS

H & D	Watkins P No.	Wynne F No.	H & D	Watkins P No.	Wynne F No.
10	15	24	220	323	114
20	30	35	240	352	120
40	60	49	260	382	124
80	120	69	280	412	129
100	147	77	300	441	134
120	176	84	320	470	138
140	206	91	340	500	142
160	235	98	380	558	150
200	294	109	400	588	154

The above Watkins and Wynne numbers are equivalent to the H and D, only when the latter is determined in accordance with the directions of Hurter and Driffield, that is with pyro-soda developer and using the straight portion only of the density curve.

To convert H and D into Watkins: Multiply H and D by 50 and divide by 34. For all practical purposes the Watkins P number is 1½ times H and D.

To convert Watkins into Wynne F Nos.: Extract the square root and multiply by 6.4.

The above methods have been approved by the Watkins Meter Company and the Infallible Exposure Meter Company.

THERMO DEVELOPMENT

Reprinted by permission from Thermo Development Chart, published by the American Photographic Publishing Company, Boston 17, Mass.

TABLE OF TEMPERATURES

Degrees Fahrt.	Min. Tray	Min. Tank	Min. Tray	Min. Tank
	T.C.1.9.		T.C.2.6	
80	3¼	12	1¾	7¾
78	3½	13	2	8½
76	3¾	14	2¼	9½
74	4	15	2½	10¾
72	4¼	16	2¾	11¾
70	4½	17	3	13
68	5	18¼	3¼	14½
66	5¼	19½	3¾	16
64	5¾	21	4	18
62	6¼	22½	4½	20
60	6½	24	5	22
58	7	26	5½	24½
56	7½	28	6	27
54	8	30	6½	30
52	8½	32	7½	33
50	9¼	34	8½	37
48	10	37	9½	41½
46	10¾	40	10½	46
44	11½	43	11½	51½
42	12¼	46	12¾	57
40	13¼	49	14½	63

TABLE OF DEVELOPMENT SPEEDS

ANSCO FILM, MS. BARNET—Super-speed Ortho, M; Extra Rapid Ortho, MS. Red Seal, M; Red Diamond, MS; Self-screen Ortho, MS; CENTRAL—Special XX., S; Special, M; Comet, M; Colornon, MQ; Panortho, MQ; CRAMER—Crown S; Anchor, MQ; Banner X, S; Inst. Iso., MQ; Med. Iso. MQ; Commercial Isonon, MQ; Portrait Isonon, M; Trichromatic, MQ; Spectrum, MQ; Slow Iso, MQ; Contrast, VVQ. ENSIGN FILM, MS. HAMMER—Special Extra Fast, MS; Extra Fast, M; Aurora Extra Fast, MS; Ortho Extra Fast, M; Ortho Nonhal., M; Fast, MQ; Slow, VQ. Ortho Slow, VQ. ILFORD—Monarch, VS; Zenith, VS; Special Rapid, VS; Rapid Chromatic, M; Ordinary, Q. IMPERIAL—Flash Light, M; Special Sensitive, MQ; Orthochrome S.S., MQ; Special Rapid, S; Orthochrome S.R., MS; Non-filter, MQ. KODAK—Speed Film, S; N.C. Film, S; Portrait Film, S. MARION—Record, S; P.S.; MS. PAGET—XXX M; XXXXX, MS; Swift., S; Ex. Spec. Rap., S; Ortho. Ex. Spec. Rap., MQ; Panchro Ord, Q; Panchro. Color, VQ; Spec. Rap., S; Hydra Panchro., MQ; Hydra Rapid, MQ; PREMO FILM PACK—S. SEED—Graflex, S; 30 Gilt Edge, MS; 26 X, MS; 23, MQ; L Ortho, MQ; Non-halation, MQ; Panchromatic, VQ. STANDARD—Extra, Orthonon, MQ; Polychrome, MQ. STANLEY—50, M; Commercial, MQ. WELLINGTON—Extreme, S; 'Xtra Speedy, MS; Film, MS; Iso Speedy, M; Portrait Speedy, M; Anti-Screen, M; Speedy Spec. Rap., M; Ortho Process, M; Wratten—Panchro, MQ; Process Panchro, Q.

WATKINS THERMO PYRO-SODA T. C. 1.9

a.	Potassium metabisulphite	80 gr.
	Pyro	160 gr.
	Sodium sulphite, dry	1 oz.
	Water to make	10 oz.
b.	Sodium carbonate, dry	2 oz.
	Potassium bromide	40 gr.
	Water to make	10 oz.

MODIFIED THERMO M. Q. T. C. 1.9

a.	Potassium metabisulphite	60 gr.
	Metol	30 gr.
	Hydrochinon	90 gr.
	Water to make	20 oz.
b.	Sodium sulphite, dry	1 oz.
	Sodium carbonate, dry	1½ oz.
	Water to make	20 oz.

MODIFIED THERMO D. Q. T. C. 2.6

a.	Potassium metabisulphite	60 gr
	Duratol	30 gr.
	Hydrochinon	90 gr.
	Water to make	20 oz.
b.	Sodium sulphite, dry	1½ oz.
	Sodium carbonate, dry	2 oz.
	Water to make	20 oz.

Instructions.—Look up the Development Speed of the plate or film and mix the developer as directed for that class, USING WATER WHICH HAS STOOD IN THE ROOM LONG ENOUGH TO ATTAIN ROOM TEMPERATURE. In safe ruby light (or total darkness) place the plate in the tray, flow it with developer, cover the tray light-tight, and note the time. We recommend handling plates in total darkness and using white light while they are covered. Now observe the temperature of the room and consult the Table of Temperatures, where the correct time for development will be found opposite the degree and under the Temperature-Coefficient of the developer in use. The tray may be rocked now and then during development, but the plate should not be removed from the solution until the time is up. Then turn out the white light and rinse and fix the plate by safe light or in a covered tank.

If the first trial does not give the right printing quality to suit your requirements, classify the plate one class nearer VS for more or one class farther from VS for less contrast.

Dilution of Developer.—	VVQ	VQ	Q	MQ	M	MS	S	VS
Watkins Thermo Pyro-Soda	1	1⅓	1¾	2¼	3	4	5	6¾
Modified Thermo M.-Q. Modified Thermo Duratol	1½	2	2⅔	3⅓	4½	6	8	10

drams of each stock to be diluted to make total volume 3 ounces for tray or 10 ounces for tank development.

Rodinal (Citol, Azol, Certinal)	20	26	35	45	60	80	105	135

minims solution to be made up to 3 ounces for tray or 9 ounces for tank. T. C. 1.9.

Dilution of Dev.	V VQ	V Q	Q	M Q	M	M S	S	V S
Metabisulphite grs. Potass.	1.68	* 2¼	3.	4.	5.	6.8	9.	12.
Metol	.84} or 1.68	1⅛} or 2¼	1½} or 3	2.} or 4	2½} or 5	3.4} 6.8	4½} or 9	6} 12
Hydrochinon	2.52} 1.68	3⅜} 2¼	4½} 3	6.} 4	7½} 5	10.2} 6.8	13½} 9	18} 12
Sod. Sulphite	12.5	16½	22.	28.	37.	50.	66.	82.
Sod. Carbonate	18.75	24¾	33.	42.	55.	70.	99.	123.
Water	30 ʒ	30 ʒ	30 ʒ	30 ʒ	30 ʒ	30 ʒ	30 ʒ	30 ʒ

*For flashlight pictures equal parts of Hydrochinon and Eikonogen give softer effects.

N.B.—A single portion of developer should be used for only one plate, but the used developer (except pyro) should be saved for paper. If fog occurs, add to each ounce of water used for diluting, 7½ to 10 grs. dry sulphite.

O. C. Conkling.

TABLE FOR CALCULATING DISTANCES IN ENLARGING OR REDUCING

From The British Journal Photographic Almanac

Focus of Lens	Times of Enlargement and Reduction							
Inches	1 Inch	2 Inches	3 Inches	4 Inches	5 Inches	6 Inches	7 Inches	8 Inches
2..........	4 4	6 3	8 2⅔	10 2½	12 2⅖	14 2⅓	16 2 2/7	18 2¼
2½........	5 5	7½ 3¾	10 3⅓	12½ 3⅛	15 3	17½ 2 9/10	20 2 6/7	22½ 2 3/16
3..........	6 6	9 4½	12 4	15 3¾	18 3⅗	21 3½	24 3 3/7	27 3⅜
3½........	7 7	10½ 5¼	14 4⅔	17½ 4¾	21 4⅕	24½ 4 1/12	28 4	31½ 3 9/10
4..........	8 8	12 6	16 5⅓	20 5	24 4⅘	28 4⅔	32 4 4/7	36 4½
4½........	9 9	13½ 6¾	18 6	22½ 5⅗	27 5⅖	31½ 5¼	36 5 1/7	40½ 5 1/16
5..........	10 10	15 7½	20 6⅔	25 6¼	30 6	35 5⅚	40 5 5/7	45 5⅝
5½........	11 11	16½ 8¼	22 7⅓	27½ 6⅘	33 6½	38½ 6 5/12	44 6 2/7	49½ 6 3/16
6..........	12 12	18 9	24 8	30 7½	36 7⅕	42 7	48 6 6/7	54 6¾
7..........	14 14	21 10½	28 9⅓	35 8¾	42 8⅖	49 8⅙	56 8	63 7⅞
8..........	16 16	24 12	32 10⅔	40 10	48 9⅗	56 9⅓	64 9 1/7	72 9
9..........	18 18	27 13½	36 12	45 11¼	54 10⅘	63 10½	72 10 2/7	81 10⅛

The object of this table is to enable any manipulator who is about to enlarge (or reduce) a copy any given number of times to do so without troublesome calculation. It is assumed that the photographer knows exactly what the focus of his lens is, and that he is able to measure accurately from its optical center. The use of the table will be seen from the following illustration: A photographer has a *carte* to enlarge to four times its size, and the lens he intends employing is one of 6 inches equivalent focus. He must therefore look for 4 on the upper horizontal line and for 6 on the first vertical column and carry his eye to where these two join, which will be 30-7½. The greater of these is the distance the sensitive plate must be from the center of the lens; and the lesser, the distance of the picture to be copied. To *reduce* a picture any given number of times, the same method must be followed; but in this case the greater number will represent the distance between the lens and the picture to be copied, the latter that between the lens and the sensitive plate. This explanation will be sufficient for every case of enlargement or reduction.

If the focus of the lens be 12 inches, as this number is not in the column of focal lengths look out for 6 in this column and multiply by 2, and so on with any other numbers.

TABLES OF DISTANCES AT AND BEYOND WHICH ALL OBJECTS ARE IN FOCUS WHEN SHARP FOCUS IS SECURED ON INFINITY

(Figured for a circle of confusion of 1/100 inch)

Focal Length of Lens in Inches	Ratio marked on Stops													
	f/4	f/5.6	f/6	f/7	f/8	f/10	f/11	f/15	f/16	f/20	f/22	f/32	f/44	f/64
	Number of feet after which all is in focus													
4	33	24	22	19	17	13	12	9	8	7	6	4	3	2
4¼	38	27	25	21	19	15	14	10	10	7	7	5	3½	2½
4½	42	30	28	24	21	17	15	11	11	8½	7½	5½	4	3
4¾	47	34	31	27	24	19	17	12	12	9½	8½	6	5	3
5	52	36	35	30	26	21	19	14	13	10½	9½	6½	5½	3½
5¼	57	40	38	33	28	23	21	15	14	11½	10½	7	5½	3½
5½	63	45	43	36	31	25	23	17	15	12½	11½	7½	6	4
5¾	68	50	46	38	34	27	25	18	17	13½	13	8½	6½	4
6	75	54	50	42	38	30	28	20	19	15	14	9	7	4½
6¼	81	58	54	46	40	32	29	22	20	16	15	10	7½	5
6½	87	62	58	50	44	35	32	23	22	17½	16	11	8	5½
6¾	94	67	63	54	47	38	34	25	24	19	17	12	8½	6
7	101	72	68	58	51	40	37	27	25	20	18	12½	9	6
7¼	109	78	73	62	54	44	39	29	27	22	20	13½	10	6½
7½	117	83	78	64	58	47	42	31	29	24	21	14½	10½	7
7¾	124	90	83	71	62	50	45	33	31	25	22	15½	11	7½
8	132	96	88	76	68	52	48	36	32	28	24	16	12	8
8¼	141	100	94	80	71	56	51	37	35	29	25	17½	12½	8½
8½	150	104	100	84	76	60	56	40	38	30	27	19	13½	9
8¾	156	111	104	89	78	63	57	42	39	32	29	20	14	10
9	168	120	112	96	84	67	61	45	42	34	31	21	15	10½
9¼	180	127	116	101	90	71	65	47	45	35	32	22	16	11
9½	190	133	125	107	95	75	68	50	47	37	34	24	17	12
9¾	197	141	131	113	99	79	72	52	50	39	36	25	18	12½
10	208	148	140	120	104	83	75	55	52	42	38	26	19	13

If sharp focus is secured on any of the distances shown, then with the stop indicated all objects are in focus from half the distance focused on up to infinity.

LENGTH OF STUDIO

REQUIRED FOR LENSES OF DIFFERENT FOCAL LENGTHS FROM 6 TO 8 FEET IS ALLOWED FOR THE CAMERA AND OPERATOR

From "Photographic Lenses" by BECK and ANDREWS

Focus of Lens	Size	Kind of Portrait	Length of Studio	Dist. of Lens from Object
Inches			In Feet	In Feet
6	Carte de Visite 3¼x4¼	Full Length	18 to 20	11 to 12
7½	Carte de Visite	Full Length	22 to 25	14 to 15
8½	Carte de Visite	Full Length	24 to 28	17 to 19
		Bust	10 to 15	5
9½	Cabinet and smaller groups	Full Length	20 to 23	12 to 13
		Bust	12 to 17	7
11	Cabinet and 5x7 groups	Full Length	25 to 30	17 to 18
		Bust	13 to 20	8
14½	Cabinets, panels and 6½x8½ groups	Full Length	32 to 40	23 to 24
		Bust	14 to 20	7
19	10x12 portraits or groups	Full Length	20 to 25	13
		Bust	14 to 20	7
24	16x20 portraits or groups	Full Length	25 to 30	14
		Bust	14 to 20	8

"UNIFORM SYSTEM" NUMBERS FOR STOPS FROM

$\frac{f}{1}$ TO $\frac{f}{100}$

In the following table Mr. S. A. Warburton calculated the exposure necessary with every stop from $\frac{f}{1}$ to $\frac{f}{100}$ compared with the unit stop of the "uniform system" of the Photographic Society of Great Britain. The figures which are underlined show in the first column what $\frac{f}{a}$ must be in order to increase the exposure in geometrical ratio from $\frac{f}{4}$, the intermediate numbers showing the uniform system number for any other aperture.

f	U. S. No.	*f*	U. S. No.	*f*	U. S. No.
1	1/16	15	14.06	58	210.25
1¼	.097	16	16	59	217.56
1.414	⅛	17	18.06	60	225.00
1½	.140	18	20.25	61	232.56
1¾	.191	19	22.56	62	240.25
2	¼	20	25.00	63	248.06
2¼	.316	21	27.56	64	256
2½	.390	22	30.25	65	264.06
2.828	½	22.62	32	66	272.25
2¾	.472	23	33.06	67	280.56
3	.562	24	36.00	68	289.00
3¼	.660	25	39.06	69	297.56
3½	.765	26	42.25	70	306.25
3¾	.878	27	45.56	71	315.06
4	1	28	49.00	72	324.00
4¼	1.12	29	52.56	73	333.06
4½	1.26	30	56.25	74	342.25
4¾	1.41	31	60.06	75	351.56
5	1.56	32	64	76	361.00
5¼	1.72	33	68.06	77	370.56
5½	1.89	34	72.25	78	380.25
5.656	2	35	76.56	79	390.06
5¾	2.06	36	81.00	80	400.00
6	2.25	37	85.56	81	410.06
6¼	2.44	38	90.25	82	420.25
6½	2.64	39	95.06	83	430.56
6¾	2.84	40	100.00	84	440.00
7	3.06	41	105.06	85	451.56
7¼	3.28	42	110.25	86	462.25
7½	3.51	43	115.56	87	473.06
7¾	3.75	44	121.00	88	484.00
8	4	45	126.56	89	495.06
8¼	4.25	45.25	128	90	506.25
8½	4.51	46	132.25	90.50	512
8¾	4.78	47	138.06	91	517.56
9	5.06	48	144.00	92	529.00
9¼	5.34	49	150.06	93	540.56
9½	5.64	50	156.25	94	552.25
9¾	5.94	51	162.56	95	564.06
10	6.25	52	169.00	96	576.00
11	7.56	53	175.56	97	588.06
11.31	8	54	182.25	98	600.25
12	9.00	55	189.06	99	612.56
13	10.56	56	196.00	100	625
14	12.25	57	203.06		

American Photographic Societies

This list is compiled from information received from an inquiry form sent to the societies during the latter half of 1924. It includes many societies not given in the 1924 Annual, but falls short of completeness as a record of the photographic societies of America. Secretaries of societies not here listed are urged to send us particulars of their organization so that the list may be fully representative of society activities.—Editor.

THE ACADEMY OF SCIENCE AND ART OF PITTSBURGH, PHOTOGRAPHIC SECTION, SPONSOR OF THE PITTSBURGH SALON—Headquarters, Carnegie Institute, Schenley Park. Organized January 23, 1900. Membership 100. Meetings, second and fourth Tuesdays in each month at Carnegie Institute. *President,* O. C. Reiter, 2424 Penn Avenue, Pittsburgh, Pa.; *Vice-President,* N. S. Woolridge, 836 South Linden Avenue, Pittsburgh, Pa.; *Print Director,* S. A. Martin, 1011 Heberton Avenue, Pittsburgh, Pa.; *Lantern Slide Director,* L. C. Rennie, Box 151, Wilkinsburg, Pa.; *Secretary-Treasurer,* P. F. Squier, 237 Avenue B, Westinghouse Plan, East Pittsburgh, Pa. *Executive Committee,* C. E. Beeson, F. O. Van Gorder, W. C. Mellor, O. C. Reiter, P. F. Squier.

ALLENTOWN CAMERA CLUB—Allentown, Pa. Headquarters, 533 Hamilton Street. *President,* Nevin Yoder; *Vice-President,* David Knauso; *Secretary,* Chas. Ravert, 1011 So. Sixth Street, Allentown, Pa. Member Associated Camera Clubs of America. Meetings every Tuesday. Membership 60.

AMERICAN INSTITUTE PHOTOGRAPHIC SECTION—New York City Headquarters, 322-324 West 23d Street. Established March 26, 1859. Stated meetings, first and third Mondays of each month. No meetings during Summer months. *Chairman,* Oscar G. Mason; *Vice-Chairman,* Robert A. B. Dayton; *Treasurer,* James Y. Watkins; *Secretary,* John W. Bartlett, M.D., F.R.P.S., 149 West 94th Street.

ASSOCIATED CAMERA CLUBS OF AMERICA—Headquarters, Arno Building, Fourth & Sycamore Sts., Cincinnati, Ohio. *President,* M. R. Witt, Photographic Society of Philadelphia; *Vice-President,* L. F. Bucher, Newark Camera Club; *Secretary,* Chas. H. Partington, Camera Club of Cincinnati; *Treasurer,* H. W. Greene, Camera Club of Cincinnati; *Board of Directors,* W. A. Alcock, Pictorial Photographers of America; Raymond Trowbridge, Chicago Camera Club; J. L. Tormey, Photographic Club of Baltimore; R. M. Crater, Orange Camera Club; J. C. Stick, So. California Camera Club; C. M. Jaquith, Portland (Me.) Camera Club. Association Print Director, Julius Cindrich, Los Angeles, Cal. Motive—Closer affiliation of Camera Clubs, Annual exhibits, Interchanges of prints and slides, as well as ideas, literature and the general promotion of artistic photography through the medium of the Camera Club or Photographic Society. Membership, thirty-four clubs. Association organized May 1, 1919. Correspondence invited with non-member organization and those desiring to form a club or society.

BERKSHIRE PHOTOGRAPHIC SOCIETY—Headquarters, care of A. W. Jacobs Studio, 30 North Street. Pittsfield, Mass. Meetings 2nd Friday of each month. Member Associated Camera Clubs of America.

BLUE BELL CAMERA CLUB—Detroit, Mich. Headquarters, 1365 Cass Avenue. *President,* E. J. Arnold; *Vice-President,* C. C. Ashbaugh; *Treasurer,* H. D. Yankey; *Corresponding Secretary,* Miss. H. I. Quick; *Secretary,* Wm. B. Kemp, 9236 Genessee Avenue.

BOSTON CAMERA CLUB—Boston, Mass. Established 1881. Incorporated 1886. Membership, 75. *President,* P. Hubbard; *Secretary,* John H. Thurston, 234 Boylston Street.

BOSTON YOUNG MEN'S CHRISTIAN UNION CAMERA CLUB—Boston, Mass. Headquarters, 48 Boylston Street, Boston. Organized, 1908. *President,* William H. C. Pillsbury; *Vice-President,* Ralph Osborne; *Secretary,* Philip A. Palmer; *Treasurer,* Livingston Stebbins, 6 Beacon Street, Boston, Mass. Meetings first Tuesday each month at club rooms, 48 Boylston Street. Member Associated Camera Clubs of America.

BOULDER CAMERA CLUB--Care of University of Colorado, Boulder, Colo. *President,* Severance Burrage.

BROOKLYN INSTITUTE OF ARTS AND SCIENCES, PHOTOGRAPHIC SECTION—Headquarters, Academy of Music Building, Lafayette Avenue, Brooklyn, N. Y. Organized 1886. Membership 75. Meetings for general discussion and criticism the second Monday each month except July and August. Courses in Rudiments of Photography, Advanced Photography, Pictorial Photography, Loan Exhibitions. Annual exhibit of the Department in May. Demonstrations of the various processes every third Friday evening. *President,* Wm. Elbert Macnaughton; *Vice-President,* Wm. Alexander Alcock; *Secretary,* Sophie Louisa Lauffer, 86 Greene Avenue, Brooklyn; *Treasurer,* J. Halstead Patterson.

BUFFALO CAMERA CLUB—Buffalo, N. Y. Headquarters, 463 Elmwood Avenue. *President,* C. A. Pierman; *Vice-President,* Emil Strub; *Secretary,* Lester F. Davis; *Treasurer,* W. P. Hubbard, Member of Associated Camera Clubs of America.

CALIFORNIA CAMERA CLUB—San Francisco, Cal. Headquarters, 45 Polk St., San Francisco, Cal. Established March 18, 1890. Incorporated April 5, 1890. Membership 337. Date of meeting second Tuesday, monthly. Monthly print exhibitions and illustrated lectures. *President,* Horace Hirschler; *Secretary,* J. A. Morrow. Members of other clubs are cordially invited to visit our rooms when in San Francisco. Member Associated Camera Clubs of America. Salon announcements desired.

CAMERA CLUB, THE—New York. Club Rooms, 121 West 68th St. Established in 1884, and Incorporated in 1896 upon consolidation of The Society of Amateur Photographers of New York and The New York Camera Club. Membership 245. Annual Meeting first Thursday after the first Monday in January. *President,* J. H. McKinley; *Secretary,* W. N. Capen. Affiliated with The Royal Photographic Society of Great Britain.

"CAMERADS"—New Brunswick, N. J. Headquarters, corner Church and George Streets. Established April 24, 1890. *Secretary,* Harvey Iredell, D.D.S., Lock Box 34, New Brunswick.

CAMERA CLUB OF CINCINNATI—Cincinnati, Ohio. Headquarters, 18 and 19 Arno Building, Fourth & Sycamore Streets. Membership 40. Meetings held on first and third Mondays of each month. *President,* Dan C. Morganthaler; *Vice-President,* Charles A. Weddigen; *Secretary,* H. Viehman; *Treasurers,* Harry W. Greene and Charles H. Partington. Member of Associated Camera Clubs of America.

CAMERA CLUB OF THE SYRACUSE Y. M. C. A., THE. Organized December 16, 1922. Regular meeting the second Monday in each month, third floor, Y. M. C. A. *President,* E. Q. Williams; *Vice-President,* Kent C. Haven; *Treasurer,* R. J. Lane; *Secretary,* J. O. Sprague, in care of Y. M. C. A., Syracuse, N. Y.

CAMERA CLUB OF WATERBURY—Waterbury, Conn., P. O. Box 712. Organized Sept., 1919. Meets Monday evenings at the Y. M. C. A. Room 10, 136 West Main St. *President,* Arthur H. Ganung; *Secretary,* Hollis M. French. Member Associated Camera Clubs of America.

CAMERA PICTORIALISTS OF LOS ANGELES—Los Angeles, Cal. Headquarters, 811 Washington Building. Association formed for strictly pictorial work; the holding of an annual International Salon; and for the good of the cause generally. Meeting, first Monday of month. *Director,* John C. Stick; *Secretary,* N. P. Moerdyke.

CAPE ANN CAMERA CLUB, INC.—Gloucester, Mass. Headquarters, 119 Main St. Organized 1897. Membership limited and filled (100). Meetings first and third Friday each month, or when called. Salons, April. *Secretary,* Herman W. Spooner, 6 Proctor St., Gloucester, Mass. Completely equipped for all studio and enlargement work, also social functions, billiards, illustrated lectures, etc.

CHAFFEY CAMERA CLUB—Ontario, Upland, Cal. Headquarters, Chaffey Library. Meetings held second Wednesday of each month, 7.30 p. m. *President,* Norban Hargrove; *Vice-President,* Francis Wagner; *Secretary-Treasurer,* Albert Salter.

CHICAGO CAMERA CLUB—Chicago, Ill. Headquarters, 31 W. Lake Street. Established February 14, 1904. Incorporated February 19, 1904. Meetings every Wednesday. *President,* Frank T. Farrell; *Vice-President,* Herbert C. Fairfield; *Secretary,* Paul T. Tarnoski; *Treasurer,* Wm. D. Hughes. Member Associated Camera Clubs of America.

CLEVELAND PHOTOGRAPHIC SOCIETY, THE—Cleveland, Ohio. Headquarters, Rathskeller Building, E. 4th Street. Established June 7, 1923. Permanent organization effected at meeting of June 18. Incorporated October 9, 1920. Meetings every Wednesday. *President,* C. H. Shipman; *Vice-President,* Chas. Lederle; *Financial Secretary,* B. E. Clarkson; *Corresponding Secretary,* H. G. Cleveland; *Treasurer,* R. D. Hartman. Member Associated Camera Clubs of America.

COLUMBIA PHOTOGRAPHIC SOCIETY—Philadelphia, Pa. Headquarters, 4605 Germantown Avenue, Philadelphia. Established 1889. Incorporated July 3, 1894. Membership, 50. Business meeting first Monday of each month; other Mondays, lectures or demonstrations. Member Associated Camera Clubs of America. *President,* D. A. Adams; *Vice-President,* J. F. Mudd; *Treasurer-Secretary,* H. O. Sauer.

DALLAS CAMERA CLUB, 1709½ Elm Street., Dallas Texas. Organized July 20, 1921. *President,* V. H. Schoffelmayer; *Vice-President,* Dr. W. H. Mathews; *Secretary,* A. M. Belsher. Regular meetings every Tuesday. Monthly competition. Membership 31.

DARTMOUTH CAMERA CLUB—Headquarters, 7-8 Robinson Hall, Hanover, N. H. Organized, 1915. Membership, 30. *President,* Geo. Rockwood. All communications addressed to Prof. Leland Griggs, Hanover, N. H. Member Associated Camera Clubs of America.

DENVER CAMERA CLUB, THE—Denver, Colo. Headquarters, Chappell House, 1300 Logan Street. Incorporated Jan. 1, 1923, with 60 members. *President,* Clark Blickensderfer; *Vice-President,* Harold D. Roberts, *Secretary,* Katharine Bruderlin, 1276 Emerson St., Denver; *Treasurer,* William F. Erwin. The Club is affiliated with the Denver Art Association and has its club rooms and dark rooms in the home of this association. Membership in the Denver Camera Club entitles the members to all privileges of the Art Association.

DETROIT CAMERA CLUB—Detroit, Mich. (Reincorporated, January, 1921). Club rooms, 43 Montcalm Street West. *President,* R. M. Reed; *Chairman,* H. F. Wegener; *Secretary,* M. Williams; *Treasurer,* Mrs. G. Newall: *Research and Instruction,* H. F. Barth. Member of the Associated Camera Clubs. Meetings held in the club rooms every Friday evening. Visitors welcome.

ELYSIAN CAMERA CLUB—307 Washington Street, Hoboken, N. J. Established 1902. Date of meeting second Thursday of each month. Membership 68 active. *President,* Charles A. Culp; *Vice-President,* Richard Reynolds; *Treasurer,* George Sting; *Recording Secretary,* Claude Martens; *Corresponding Secretary,* C. B. Beyers. Member Associated Camera Clubs of America.

GRAND RAPIDS CAMERA CLUB—Grand Rapids, Mich. Member Associated Camera Clubs of America. Studio, 401 Lindquist Building, corner Ionia Avenue and Weston Street, where demonstrations and inspiration meetings are held Thursday evenings from September to June, inclusive, with occasional field days during the summer months and monthly "hikes" during the balance of the year. *President,* A. G. Kalmbach; *Vice-President,* Miss Vera Bennett; *Secretary,* Miss Helen E. Hitchcock; *Treasurer,* Miss Minnie J. Moorehead; *Director,* Raymond B. Ryan. Annual meeting third Thursday in June.

HIGHLAND PHOTOGRAPHIC CLUB—Holyoke, Mass. *President,* Francis H. King; *Vice-President,* Halford T. Wheeler; *Treasurer,* Francis W. Bennett; *Secretary,* Ernest D. Krause. Club meets in the home of the Treasurer once a week. The club was organized on February 2, 1924. All correspondence is to be addressed to Francis W. Bennett, 7 Orchard Street, Holyoke, Mass.

INTERNATIONAL PHOTOGRAPHIC ASSOCIATION—San Francisco, Cal. Founded 1908. *President,* F. B. Hinman, Evergreen, Jefferson County, Colo.; *Chief Album Director,* Louis R. Murray, 927 Ford Street, Ogdensburg, N. Y.; *General Secretary,* A. E. Davies, 1327 Grove Street, Berkeley, Cal.; *Director Post Card Albums,* John Bieseman, Hemlock, Ohio; *Director Stereoscopic Division,* Lovic Meredith, Rupperttown, Tenn.; *Director Lantern Slide Division,* A. E. Davies, 1327 Grove Street, Berkeley, Cal. *Album Directors:* Eastern Division, No. 1—Under the direction of Chas. F. Rice, P. O. Box 245, Mamaroneck, N. Y., comprises New York, New Jersey, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, Delaware, Virginia, West Virginia, Kentucky, Indiana, Ohio and Michigan. Western Division, No. 2—Under the direction of Allen Young, Room 413, Claus Spreckels Building, San Francisco, Cal., comprises California, Oregon, Washington, Idaho, Nevada, Utah, Montana, Wyoming and Colorado. Southern Division, No. 3—Under the direction of Frank Reeves, Stamford, Texas, comprises Florida, Georgia, North Carolina, South Carolina, Tennessee, Mississippi, Alabama, Louisiana, Arkansas, Oklahoma, Texas, New Mexico, and Arizona. Northern Division, No. 4—Under the direction of Leonard A. Williams, 622 Second Ave., St. Cloud, Minn. This division comprises Illinois, Wisconsin, Minnesota, Iowa, Missouri, Kansas, Nebraska, North Dakota and South Dakota.

KANSAS CITY CAMERA CLUB, 1923-1924—Suite 307, Bryant Building, Kansas City, Mo. Organized 1914. Club meets second Monday of each month. Annual exhibition in January. *President,* Dr. A. H. Cordier; *Vice-President,* Val. B. Mintun; *Secretary-Treasurer,* Dr. Maclay Lyon.

KODAK PARK CAMERA CLUB—Eastman Kodak Co., Kodak Park, Rochester, N. Y. Organized Jan. 6, 1920. *President,* Geo. C. Hanneman; *Vice-President,* Bessie LaBar; *Treasurer,* Henry Wood; *Secretary,* Helen Allan, *Assistant Secretary,* Marjorie Brewster; *Recorder,* Ida Miller. Meetings are held monthly on third Thursday. Hikes on first Saturday. Annual exhibition in Rochester Memorial Art Gallery. Exhibits exchanged with other clubs.

LOWELL Y. M. C. A. CAMERA CLUB—Lowell, Mass. *Secretary,* N. R. Farnum.

MILLVILLE HIGH SCHOOL CAMERA CLUB—Organized under the direction of Prof. J. A. Ernest Zimmermann. Membership, 40, consisting of students, faculty and alumni. *President,* Thos. S. [illegible]; *Vice-President,* Florence Cassidy; *Secretary-Treasurer,* Rebecca Snerry. Club meets every second and fourth Tuesday of the month. It also conducts an annual photographic contest.

MILWAUKEE CAMERA CLUB—Milwaukee, Wis. Headquarters, Riverside Studio, 795 Oakland Avenue. Meetings every Tuesday evening. *President,* E. J. Schaefer; *Vice-President,* B. F. Langland; *Financial Secretary and Treasurer,* Edwin F. Casper; *Secretary,* F. G. Wood, Room 606, 210 Wisconsin Street; *Librarian,* W. E. Verburgt. Member Associated Camera Clubs of America. Annual exhibition in April of each year at the Milwaukee Art Institute.

MOLINE Y. M. C. A. CAMERA CLUB—Headquarters, Moline, Ill.

MONTREAL AMATEUR ATHLETIC ASSOCIATION CAMERA CLUB—Montreal, Canada. Headquarters, M. A. A. A. Building, 250 Peel Street. Organized May 1, 1906. *President,* W. Gordon Wright; *Vice-President,* P. F. Calcutt; *Secretary,* P. J. B. Brass. Exhibitions: Annual, April; Provincial, November.

NEWARK CAMERA CLUB (Inc.)—27 Franklin Street, Newark, N. J. Organized 1888. Incorporated 1910. Meeting night, second Monday of each month. Motto, "SOMETHING OF INTEREST EVERY MONDAY NIGHT." Member and organizer of Associated Camera Clubs of America. Visitors welcome. *President,* Charles A. Knapp; *Vice-President,* Edward Browaski; *Secretary,* William L. Woodburn; *Treasurer,* Ezra F. Packard. Club Bulletin, THE GROUND-GLASS; issued monthly.

NEW BRITAIN CAMERA CLUB—Organized 1892. *President,* W. B. Rossberg; *Vice-President,* E. H. Start; *Secretary-Treasurer,* Paul A. Stahl, 259 Main Street, New Britain, Conn. Meets first and third Tuesdays, 259 Main Street. Member Associated Camera Clubs of America.

NEW HAVEN CAMERA CLUB—17 Broadway. Organized 1911. Membership, 41. *President,* Paul B. Hunt; *Vice-President,* Charles Koeberle; *Secretary-Treasurer,* William R. Frisbie, 172 Norton Street, New Haven, Conn. Meetings held every Thursday. Business meetings, First Thursday in the month. Member Associated Camera Clubs of America.

ORANGE CAMERA CLUB—East Orange, N. J. Headquarters, Main and Clinton Streets. Established March 21, 1892. Incorporated May 19, 1893. Membership, 120. Date of meetings, first and third Saturdays of each month, except July, August and September. *President,* Richard E. Pease; *Secretary,* Ernest Williams, Main and Clinton Streets, East Orange, N. J.

OREGON CAMERA CLUB—Portland, Oregon. Headquarters, 507 Abington Building. Established 1895. Incorporated 1903. Membership, 75. Annual meeting, first Tuesday in January. *President,* A. S. Trelawny; *Secretary,* W. G. Winchester; *Treasurer,* F. E. Hodapp. Annual exhibit, in Spring. Member Associated Camera Clubs of America.

PHOTOGRAPHIC CLUB OF BALTIMORE CITY—Baltimore, Md. Headquarters, Photographic Section Maryland Academy of Sciences, 105 W. Franklin Street. Established 1885. Incorporated 1890. Membership, active, 60. Meetings, second Tuesday in month. *President,* H. E. Moore; *Vice-President,* H. L. Rogers; *Secretary,* A. L. Sanders. Member Associated Camera Clubs of America.

PHOTOGRAPHERS' GUILD OF THE SOCIETY OF ARTS AND CRAFTS—Boston, Mass. *Dean,* Livingston Stebbins; *Secretary and Treasurer,* Ralph Osborne; *Councilors,* Mrs. Dorothy Jarvis and John Murdoch. Organized Feb. 18, 1916. Meetings held at members' studios.

PHOTO PICTORIALISTS OF CINCINNATI—Cincinnati, Ohio. Organized 1920. Work devoted to advancement of pictorial photography. Membership, six. Meetings on call only. Chas. H. Partington, director; G. A. Ginter, Robt. P. Nute, Chas. A. Weddigen, Harry W. Green, Peter Scherrer. Address communications to the director, 4113 Thirty-second Street.

PHOTOGRAPHIC SOCIETY OF PHILADELPHIA—Philadelphia, Pa. Headquarters, 1615-1617 Sansom Street. Established November, 1862. Incorporated April 24, 1885. Membership, 100. Date of meetings: Members, second Wednesday. *President,* Dr. Robert F. Ridpath; *Secretary,* E. A. McKinley, 1615 Sansom Street; *Treasurer,* J. J. Baylson. Date of members' annual exhibition, March. Member Associated Camera Clubs of America.

PICTORIAL PHOTOGRAPHERS OF AMERICA—New York City. Headquarters, Art Center, 65 East 56th Street. Meetings, first Monday evening in each month from October to June. Officers for 1924, *President,* G. W. Harting, 51 West 10th Street; *Vice-President,* Sophie L. Lauffer; *Hon. Vice-Presidents,* Prof. Chas. F. Chandler, Gertrude Kasebier, Clarence H. White; *Secretary,* Dr. Arthur Nilsen, 55 West 10th Street; *Treasurer,* Jerry D. Drew, 83 Cliff Street. Member Associated Camera Clubs of America.

PICTORIAL PHOTOGRAPHIC SOCIETY OF SAN FRANCISCO, CAL.—*Director,* Anson Herrick; *Vice-Director,* L. Goetz; *Secretary-Treasurer,* G. H. S. Harding, 564 Market Street, San Francisco; *Secretary Salon Committee,* H. A. Hussey, 64 Pine Street, San Francisco.

PITTSBURGH SALON, THE.—Pittsburgh, Pa. Under auspices of Photographic Section of the Academy of Science and Art Membership consists of the leading pictorialists of the United States. *President,* O. C. Reiter, 2424 Penn Ave.; *Vice-President,* N. S. Woolbridge, 636 South Linden Ave.; *Print Director,* S. A. Martin, 1011 Heberton Ave.; *Lantern Slide Director,* L. C. Rennie, Box 151, Wilkinsburg, Pa.; Secretary-Treasurer, 237 Ave. B, Westinghouse Plan, East Pittsburgh, Pa.

PORTLAND CAMERA CLUB PHOTOGRAPHIC SECTION OF THE PORTLAND SOCIETY OF ART—Portland, Me. Headquarters, L. D. M. Sweat Memorial, Spring, corner High Street. Established 1899. Membership, 93. Date of meetings every Monday evening. *President,* J. Bruce McCracken, 54 Sherwood St.; *Vice President,* Harvard M. Armstrong, Cape Elizabeth. *Secretary and Treasurer,* E. Roy Monroe, 36 Exchange Street; *Exhibition Committee,* E. Roy Monroe, 36 Exchange Street, Dr. Rupert S. Lovejoy, Trelawny Bldg., Roger P. Jordan, 191 Middle Street. Member Associated Camera Clubs of America.

POSTAL PHOTOGRAPHIC CLUB—Headquarters, Washington, D. C. Established December, 1888. Membership, 40. Date of meetings, no regular meeting. *President,* Charles E. Fairman; *Secretary,* Ernest L. Crandall, 1331 Newton Street, N. E., Brookland, Washington D. C. Albums circulate among members monthly, except August and September.

READING CAMERA CLUB—Reading, Pa. Headquarters, 610 Court Street. Established 1913. Meetings first and third Thursdays of each month. Quarterly exhibits for members only. Annual exhibit early in March. *President,* Harrison N. Mucher; *Secretary,* L. Roy Frey, 922 Hamilton Place, Wyomissing, Pa.

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SOUTHERN CALIFORNIA CAMERA CLUB (of the Southwest Museum, Inc.), 104-105 Stimson Building, 129 West 3rd Street, Los Angeles, Cal. Expect to move into new home at Southwest Museum late in 1924. Membership 100. *President,* Torrance C. Welch; *Vice-President,* Julius Cindrich; *Secretary,* R. L. van Oosting; *Treasurer,* Miss Maud Robertson. New officers elected second Tuesday in December. Meetings open to the public every Thursday night. Member Associated Camera Clubs of America. Second annual exhibition of Pictorial Photography from Rocky Mountain and Pacific Coast States to be held at Southwest Museum, early 1925. Expect to make it an annual National exhibition. Monthly bulletin, the "Accelerator" will be sent free upon request. Will be pleased to receive notices of salons, exhibitions, contests, etc.

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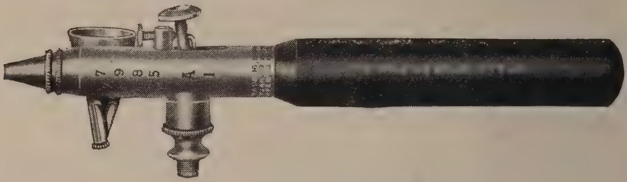

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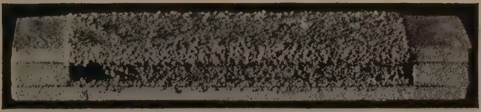

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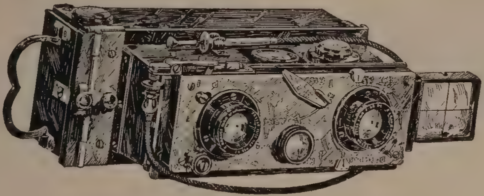

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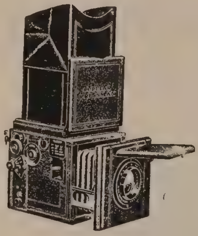

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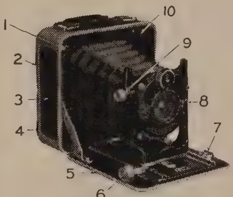

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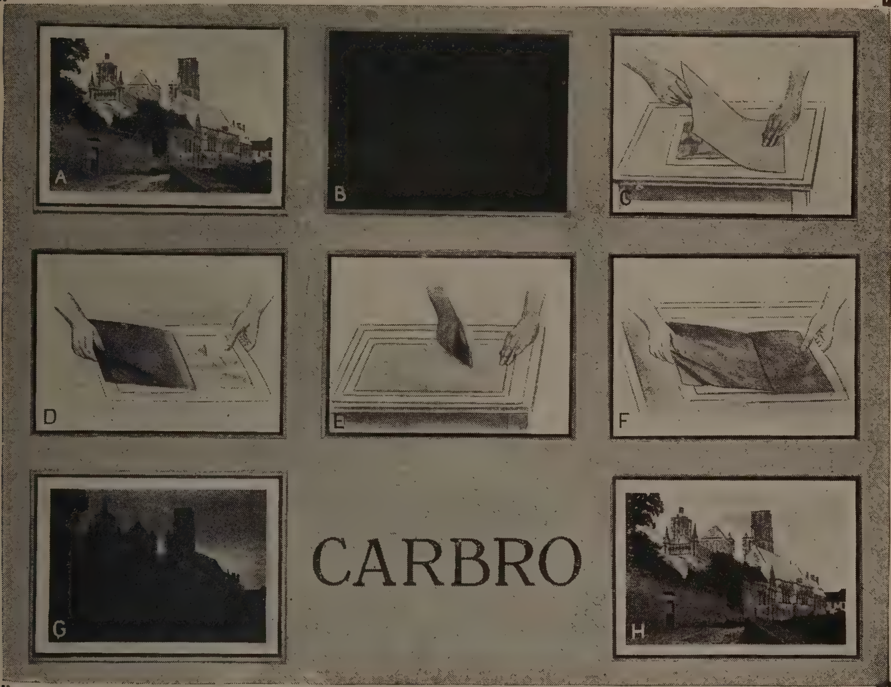

"A" is the Bromide print. "B" is the pigment paper, which after immersion in chemical solutions is laid down on the Bromide print ("C") squeegeed and placed between greaseproof paper for 15 minutes. At the expiration of that time, the Pigment paper is stripped off the Bromide print ("D") and squeegeed into contact with a sheet of Support paper ("E"). The adhering papers are placed between dry blotting paper for about 20 minutes and then immersed in warm water of about 95° Fahr. As soon as the gelatine begins to ooze from the edges, the pigment paper is stripped from the Support paper ("F") leaving a dark mass of pigmented gelatine on the Support paper ("G") in which the photograph is just visible. The print is gently splashed with warm water until development is complete ("H").

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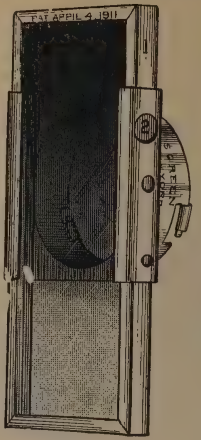

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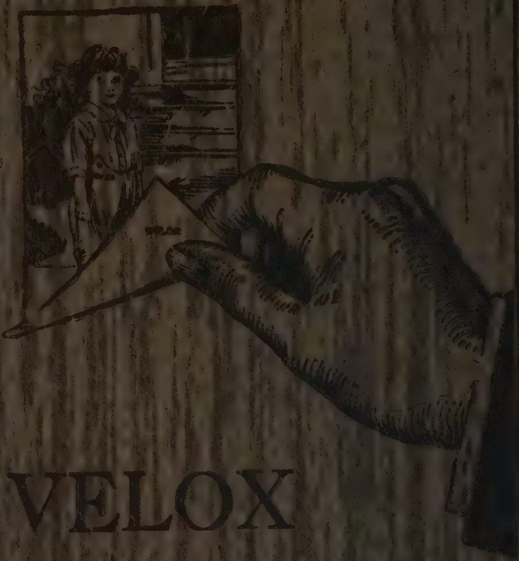

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